



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

SEP 24 2014

VIA EMAIL AND UPS – SIGNATURE REQUIRED

The Honorable Katherine Hammack
Assistant Secretary of the Army
Installation, Energy and Environment
Office of the Assistant Secretary of the Army
110 Army Pentagon, Room 3E464
Washington, DC 20310-0110

Re: RCRA Section 7003 Unilateral Administrative Order
Fort Gillem, Lake Forest, Clayton County, Georgia

Dear Ms. Hammack:

Enclosed please find a Unilateral Administrative Order (Order) issued to the United States Department of the Army (Army) by the United States Environmental Protection Agency (EPA), regarding actions that the Army must take to address contamination in the property surrounding the former Fort Gillem, located in Forest Park, Clayton County, Georgia. The Order is issued pursuant to Section 7003 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6973.

The Order becomes final and effective within eleven (11) calendar days of its receipt unless, within ten (10) calendar days of receipt, a conference is requested with the EPA Assistant Administrator of the Office of Enforcement and Compliance Assurance. In addition, the Order requires that, within five (5) calendar days of the Effective Date of the Order, the Army notify, in writing, the EPA Project Manager of its intent to comply with the Order. If the Army does not provide written notification to the EPA Project Manager within that time frame, it will be deemed a violation of the Order.

If you have any questions about the Order, please have a member of your staff contact Cathy Amoroso at (404) 562-8637, or for legal questions, please contact Martha Brock at (404) 562-9546. You may also contact me at (404) 562-8313 or by email at farmer.alan@epa.gov.

Sincerely,

A handwritten signature in dark ink, appearing to read "G. Alan Farmer". The signature is fluid and cursive, with the first name "G." and last name "Farmer" clearly distinguishable.

G. Alan Farmer
Director
RCRA Division

Enclosure

cc: Judson H. Turner, Director, Georgia Environmental Protection Division
David Kling, Director, EPA Federal Facilities Enforcement Office

**UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 4**

IN THE MATTER OF:

United States Department of the Army,

Respondent

Fort Gillem,
Forest Park, Georgia
CERCLIS NO. GA0210020046,

Facility

U.S. EPA DOCKET NO.
RCRA-04-2014-4251

Proceeding under Section 7003(a) of the
Resource Conservation and Recovery Act,
as amended, 42 U.S.C. § 6973(a)
UNILATERAL ADMINISTRATIVE ORDER

I. JURISDICTION

1. This Administrative Order ("Order") is issued to the United States Department of the Army ("Respondent") by the United States Environmental Protection Agency ("EPA") pursuant to the authorities vested in the Administrator of EPA by Section 7003 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act and by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6901 *et seq.* (hereinafter collectively referred to as "RCRA"). The authority vested in the EPA Administrator has been delegated to the Regional Administrator of EPA, Region 4, who in turn has redelegated this authority to the Director of the Resource Conservation and Recovery Act Division, Region 4. Notice of this Order has been provided to the State of Georgia through the Environmental Protection Division ("Ga EPD"), as required by Section 7003(a) of RCRA, 42 U.S.C. § 6973(a).

II. PARTIES BOUND

2. This Order shall apply to and be binding upon Respondent, its agents and assigns, and upon all other persons and entities who are under the direct or indirect control of Respondent.

3. Respondent shall provide a copy of this Order to all of its supervisory personnel, contractors, laboratories, and consultants retained to conduct or monitor any portion of the work

performed pursuant to this Order within seven (7) days of the Effective Date of this Order or date of such retention, whichever is later. Respondent shall condition all contracts with the aforementioned on compliance with the terms and conditions of this Order. Respondent shall instruct all supervisory personnel, contractors, laboratories, and consultants retained to conduct or monitor any work pursuant to this Order to perform such work in accordance with the requirements of this Order.

III. DEFINITIONS

4. Unless otherwise expressly provided herein, terms used in this Order that are defined in Section 1004 of RCRA, 42 U.S.C. § 6903, shall have the meaning assigned therein. In addition, whenever the terms listed below are used in this Order or the appendices attached hereto, the following definitions shall apply:

- a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601 to 9675.
- b. "Day" shall mean a calendar day. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or federal holiday, the period shall run until the close of business on the next working day.
- c. "Effective Date" shall mean the effective date of this Order as provided in Section XXVI (Effective Date) herein.
- d. "EPA" shall mean the United States Environmental Protection Agency and its successor departments, agencies and instrumentalities.
- e. "Facility" or "Site" shall mean the property known as the former Fort Gillem, identified as EPA ID No. GA0210020046 in the Federal Hazardous Waste Compliance Docket, inclusive of both the "excess" or "closed" portion of Fort Gillem and the active Army installation, known as the Gillem Enclave, located in Forest Park, Georgia. The definition excludes the previously transferred portion of the property with EPA ID No. GAN000400922, Former U.S. Army Fort Gillem Partial Areas 400, 500, 600.
- f. "Order" shall mean this Unilateral Administrative Order and all appendices attached hereto. In the event of a conflict between this Order and any appendix, the terms of this Order shall control.
- g. "Paragraph" shall mean a portion of this Order identified by an Arabic numeral or an upper or lowercase letter.
- h. "RCRA" shall mean the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 *et seq.*
- i. "Resident" shall mean a person who considers the property as his primary domicile, or other persons who also reside at that location.

- j. "Respondent" shall mean the United States Department of the Army.
- k. "Section" shall mean a portion of this Order identified by a Roman numeral.

IV. FINDINGS OF FACT

5. The former Fort Gillem ("Site" or "Facility") is located in Forest Park, Georgia, approximately 10 miles south of the central business district of the City of Atlanta and 8 miles southeast of Fort McPherson, in Clayton County. The Site consists of approximately 1400 acres and extends approximately 2.5 miles from east to west and 1.5 miles from north to south, and is located between Georgia Highway 54 (Jonesboro Road) and U.S. Highway 23 (Moreland Avenue), and is identified in the Federal Hazardous Waste Compliance Docket as GA0210020046.

6. The former Fort Gillem's primary missions, which lasted from the 1940s until the base was closed in 2011 under the Base Realignment and Closure Act (BRAC) V, were training and materiel supply from World War II through the Persian Gulf conflict. The installation was responsible for providing the Army with weapons and equipment, research and development, procurement, production, storage, distribution, inventory management, maintenance, and disposal of surplus and waste materials during both peacetime and wartime. These activities resulted in soil, sediment, surface water, and groundwater contamination.

7. Solid wastes and hazardous constituents associated with past operations at the former Fort Gillem include strong acids, bases, solvents, heavy metals, pesticides, waste oils and material associated with laboratory operations and vehicle maintenance.

8. As a result of the BRAC V (enacted 2005), part of the former Fort Gillem was closed and identified for transfer outside the federal government, and part was retained as a military enclave. The "Gillem Enclave" is supported by Fort Gordon, U.S. Army Installation Management Command, Atlantic Region, U.S. Army.

9. As part of its Installation Restoration Program (IRP), the Respondent has identified areas of potential contamination on the Facility (Appendix A), including:

- FTG-01, North Landfill Area
- FTG-02, SE Area Dump Site
- FTG-04, 900 Area Solvent Disposal Pit
- FTG-07, Southeast Burial Sites, Burial Site No. 1
- FTG-08, SEBS, Burial Site No. 2
- FTG-09, SEBS, Burial Site No. 3
- FTG-10, SEBS, Burial Site No. 4
- FTG-13, Western Sewage Treatment Plant

The Respondent's previous environmental investigations have documented off-site surface water, groundwater, and soil gas contamination by volatile organic compounds, particularly

trichloroethene (TCE), tetrachloroethene and 1,1,2,2-tetrachloroethane, originating from various IRP sites, as more specifically described below. Relatively large contaminated groundwater plumes with maximum concentrations exceeding 100 times the maximum contaminant level (MCL) under the Safe Drinking Water Act originate from the FTG-09 and FTG-01 sites. TCE and other contaminants in groundwater have migrated beyond the Site boundary from the FTG-04, FTG-07, FTG-10 and FTG-13 areas into the adjoining residential neighborhoods.

10. North Landfill Area (NLA), FTG-01. General Description.

a. The North Landfill Area (FTG-01, NLA) is a 300+ acre area that the Respondent used for waste disposal from 1941 to the mid-1970s and encompasses 356 burial locations, trenches and pits. Portions of the area were used for disposal, landfilling, trenching, burning, indiscriminant burial and surface disposition. Exploratory trenching, drum removals and other excavation work confirms the presence of metals, solvents, waste petroleum, waste motor oil, XXCC3 powder (carbon tetrachloride and chloroform) and volatile organic compounds (VOCs), semivolatile organic compounds and pesticides as wells as drums, tanks, medical supplies, debris and a former burn pit in this area.

b. As early as 1979, Army investigations document that soil, sediment, surface water and groundwater have been impacted by buried material in this area. Four dissolved-phase groundwater plumes are associated with the NLA, three of which have migrated off the former Fort Gillem property into adjacent residential areas. Surface water streams (Eastern Stream, Western Stream and Conley Creek) which flow off-site and into the adjoining residential neighborhoods contain site-related contaminants, including volatile organic compounds.

c. By 1992, groundwater contamination with trichloroethene and other contaminants was confirmed in adjacent residential areas. Trichloroethene and related volatile organic compounds were the contaminants of concern. In 1994, residents in the impacted areas were provided connections to municipal water supply. Subsequent investigation of off-site groundwater plumes have documented trichloroethene, tetrachloroethene, 1,1,2,2-tetrachloroethane above health-based standards.

d. In 2011, the Army and Ga EPD discovered a private well in use at 1822 Slate Road, approximately 300 feet north of the Facility boundary. Upon sampling, trichloroethene and cis-1,2-dichlorochloroethene were found in the private drinking water well. The Army provided a connection to the municipal water system.

e. Several contaminants have been detected in soil gas in the North Landfill Area (NLA, FTG-01), including: dichlorobenzene, 1,1-dichloroethane, trichlorofluoromethane, vinyl chloride, methylene chloride, ethylbenzene, trichloroethene, benzene, toluene, xylene, chlorobenzene, trans-1,2-dichloroethene, isopropyltoluene, tetrachloroethene and 1,2-dichloropropane, as documented since at least 1993. *Phase I and II RI of Four Study Areas at the NLA, Ft Gillem*, April 1995.

f. Soil investigations, including post-excavation confirmatory sampling conducted in the NLA in 2010, document several contaminants, including: benzene 1,330 ug/kg (Ga HSRA 20

ug/kg); chloroform 50,400 ug/kg (EPA residential screening level 290 ug/kg); 1,1-dichloroethane 5,200 ug/kg (Ga HSRA 530 ug/kg); DDD 2,1000 (Ga HSRA 660 ug/kg); DDT 2,080 ug/kg (Ga HSRA 660 ug/kg); 1,4-dichlorobenzene 86,300 ug/kg (Ga HSRA 6,840 ug/kg); 1,2-dichloroethane 1,960 ug/kg (Ga HSRA 20 ug/kg); methylene chloride 8,840 ug/kg (Ga HSRA 80 ug/kg); 1,1,2,2-tetrachloroethane 83,000 ug/kg (Ga HSRA 130 ug/kg); 4,120 ug/kg (Ga HSRA 180 ug/kg); trichloroethene 110,000,000 ug/kg (GaHSRA 130 ug/kg); toluene 191,000 ug/kg (Ga HSRA 14,400 ug/kg); and xylene 605,000 ug/kg (Ga HSRA 20,000 ug/kg). *Final Progress Report North Landfill Area Site Wide Data Evaluation, April 2003.*

g. Four groundwater contamination plumes, three of which have migrated beyond the Site boundary and into surrounding property, are associated with the NLA. Groundwater contaminants have been documented since at least 1995, and include benzene 380 ug/l (MCL 5 ug/l); carbon tetrachloride 198 ug/l (MCL 5 ug/l); chloroform 2,800 ug/l (MCL 80 ug/l); cis-1,2-dichloroethene 430 ug/l (MCL 70 ug/l); 1,1,2,2-tetrachloroethane 1,790 ug/l (cancer risk screening concentration, Superfund Chemical Data Matrix 0.34 ug/l); trans-1,2-dichloroethene 281 ug/l (MCL 100 ug/l); trichloroethene 6,150 ug/l (MCL 5 ug/l); 1,2,2-trimethylbenzene 15 ug/l (screening level 15 ug/l); and vinyl chloride 805 ug/l (MCL 2 ug/l). *Final Progress Report North Landfill Area Site Wide Data Evaluation, April 2003.*

h. 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, tetrachlorethene, toluene, ethylbenzene, and xylene were detected in soil gas in residential areas directly north of the NLA near Slate Road and Mallard Road in Clayton County, in 2003.

i. The Army is currently conducting an air study outside of the former Fort Gillem boundary in areas of known or suspected groundwater contamination. Soil gas collected in August 2014 in residential areas beyond the north boundary of the Site show elevated levels of several contaminants, including: 1,2,4-trimethylbenzene (58 ug/m³); 1,3,5-trimethylbenzene (65 ug/m³); 1,2-dichloropropane (28 ug/m³); benzene (12 ug/m³); chloroform (8.2 ug/m³); naphthalene (12 ug/m³); xylene (110 ug/m³); tetrachloroethene (51 ug/m³); trichloroethene (1.3 ug/m³); and toluene (32 ug/m³). These contaminants are consistent with the contaminants or class of contaminants found on the Fort Gillem property, in various environmental media, during previous investigations of Fort Gillem.

j. The Army's air study also includes air sampling inside homes and businesses as well as sampling of the ambient, or outdoor, air. These samples were collected in July and August 2014 from several homes in residential areas adjacent to the north and northwest boundary of the former Fort Gillem.

k. The study described in Paragraph 10.i and 10.j is on-going. Data is available and has been evaluated for 17 homes. Of these homes, EPA has determined:

1. At least nine homes warrant prompt mitigation due to crawl space or indoor air concentrations exceeding health-based benchmarks. Six homes require monitoring, and two require additional evaluation.

2. In the nine homes that warrant prompt mitigation, 1,2,4-trimethylbenzene has been detected in the crawl space or indoor air above the established health-based benchmark of 14.6 ug/m³. The concentrations in these nine homes range from 17 ug/m³ to 140 ug/m³. The concentrations in the sub-slab and crawl space of these homes is higher than the air in the homes. TCE, tetrachloroethene, 1,1,2,2-tetrachloroethane, benzene, ethylbenzene, toluene, xylene, chloroform and naphthalene contribute to the risk in some of the homes. TCE was detected in three homes at concentrations ranging from 0.24 ug/m³ to 0.78 ug/m³.

3. In the study area where these homes are located, 1,2,4-trimethylbenzene is also present at elevated concentrations in soil gas (40 ug/m³ to 58 ug/m³).

4. In one location, ambient air is impacted by VOCs, including TCE at a concentration of 1.4 ug/m³.

11. South East Burial Sites (aka FTG-02, FTG-07, FTG-08, FTG-09, FTG-10). General Description.

a. Waste disposal occurred in several areas in the southern portion of the former Fort Gillem, and are known collectively as the "South East Burial Sites" (SEBS) and individually as FTG-02, FTG-07, FTG-08, FTG-09 and FTG-10. The approximate western boundary of this area is FTG-09, approximately located at the intersection of 1st Street and Boundary Rd. The approximate eastern boundary of this area is FTG-02, and extends approximately to the eastern boundary of the Facility at Moreland Avenue. The north boundary of this areas is FTG-07 near the former Defense Reutilization and Management Office (DRMO) and bounded to the north by Hood Avenue and the rail road corridor. The southern boundary of the SEBS is the south boundary of the Facility (Appendix A).

b. FTG-02 is located in the southeast corner of the former Fort Gillem, adjacent to the Georgia Air National Guard tract. The site was used as a dump for petroleum, oil, and lubricants (POL) and rubber products during the approximate timeframe of 1949 to 1960. Investigative work performed by the Georgia Air National Guard indicated soils in the area have been contaminated with lead, barium, cadmium, POL, and polynuclear aromatic hydrocarbons. Groundwater in this area likely flows south and west towards Joy Lake.

c. FTG-07 is located west of Buildings 307 and 308 on the southern border of the installation. Rubber and unspecified medical waste was reportedly disposed here around 1972. The area is situated in a natural drainage upslope from Upton Creek. FTG-10 is located in the southeast central part of the installation, southwest of Buildings 309 and 310. This area was used to dispose rubber products, chemicals, stripping compounds, battery acid, and acid during the approximate period of 1948 to 1964. A tributary of Upton Creek flows through FTG-10 and at a point 800 feet south enters Lake Stephens, a Site impoundment. FTG-07 and FTG-10 are miscellaneous disposal sites, with co-mingled contaminated chlorinated VOCs and aromatic VOCs. Contaminated groundwater from this area migrates in a southward direction towards Joy Lake, and underlies the residential area east of Joy Lake and south of the former Fort Gillem boundary. Contaminated groundwater discharges into Joy Lake. Contaminated surface water

migrates from Stevens Lake to Joy Lake. Storm water runoff from this area of the Site enters the residential area. *Final Expanded Site Inspection Southeast Burial Sites, August 1996.*

d. FTG-08 is located on the southern boundary of the Site, south of Stevens Lake, and east of FTG-09. Disposal of medical waste, medical supplies and food products occurred in this area between 1964 and 1972. Subsurface contamination associated with FTG-08 is addressed with FTG-09.

e. FTG-09 was reportedly used for disposal of rubber products and food waste from 1948 to 1964 and is also the location of a demilitarized leaking 500-kilogram, German-made, mustard filled aerial bomb (WWII era). "Mustard" refers to a chemical weapon compound. Decontamination activities at the former Fort Gillem associated with the decommissioning of this bomb, involved the use of chlorine compounds and 1,1,2,2-tetrachloroethane, and are believed to be the primary source of the soil, soil gas and groundwater contamination on- and off-site. The FTG-09 source area is located approximately 50 feet north of the former Fort Gillem boundary fence line, near 2nd Street and Boundary Road. The resulting groundwater plume has migrated off-site, under the residential area west of Joy Lake and south of the Site boundary, and extends in a south/east direction beyond Forest Parkway. The down-gradient extent of the plume is under investigation by the Army. An interim groundwater and soil vapor extraction and treatment system operates inside the Site boundary, and removes volatile organic compounds from soil and groundwater in the FTG-09 source area. The groundwater plume associated with FTG-09 discharges to Joy Lake and unnamed tributary to Upton Creek and Upton Creek.

f. Due to contaminated groundwater, in 2001 the Army provided connections to the municipal water system to residents near the south boundary of the Facility, east and west of Joy Lake.

g. Several contaminants have been detected in soil gas on the Site, along the south boundary of the facility at the SEBS (FTG-02, FTG-07, FTG-08, FTG-09, FTG-10) since at least 1996, including, but not limited to: benzene, ethylbenzene, xylene, toluene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, tetrachloroethene, trichloroethene, chloroform, 1,1,2-trichloroethane, methylene chloride, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, dichlorobenzene and naphthalene. *Final Expanded Site Inspection of the Southeast Burial Sites, Fort Gillem, GA dated August 1996 Draft Remedial Investigation Report, FTG-09 Study Area, Appendix A Soil Gas Results, Shaw Environmental Inc., March 2005.*

h. Several contaminants have been detected in soil on the Site, along the south boundary of the Facility and co-located with the SEBS including: methyl ethyl ketone (2-butanone), 1,2,4-trimethylbenzene, dichlorobenzene, vinyl chloride, benzene, carbon tetrachloride, chloromethane, carbon disulfide, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, tetrachloroethene, 1,2-dichloroethene, 1,1-dichloroethene, toluene, chloroform and methylene chloride, as documented since at least 1996. *Final Expanded Site Inspection of the Southeast Burial Sites, Fort Gillem, GA, August 1996.*

i. Groundwater contamination associated with the SEBS (FTG-02, FTG-07, FTG-08, FTG-09, FTG-10) located near the southern Site boundary and beyond the Site boundary includes: 1,1,2,2-tetrachloroethane 76,000 ug/l (cancer risk screening concentration, Superfund Chemical Data Matrix, 0.34 ug/l); 1,2-dichloroethene 16,000 ug/l (MCL 70 ug/l); 1,3-dichlorobenzene 210 ug/l; 1,2,4-trimethylbenzene 190 ug/l (screening level 15 ug/l); 1,3,5-trimethylbenzene 52.2 ug/l; chloroform 170 ug/l (MCL 80 ug/l); cis-1,2-dichloroethene 1,700 ug/l (MCL 70 ug/l); methylene chloride 99 ug/l (MCL 5 ug/l); tetrachloroethene 560 ug/l (MCL 5 ug/l); trans-1,2-dichloroethene 3,500 ug/l (MCL 100 ug/l); trichloroethene 11,000 ug/l (MCL 5 ug/l); and vinyl chloride 490 ug/l (MCL 2 ug/l). *Draft RI Report FTG-09 Study Area March 2005 and Draft Final RI and BRA FTG-09 July 2008.*

j. In 2003, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, trichloroethene, tetrachloroethene, toluene, and xylene were detected in soil gas in residential areas outside the boundary of the former Fort Gillem directly south of, and associated with, the SEBS near 1st Avenue, 3rd Avenue, 1st Street, 2nd Street, 4th Street, 5th Street and Cook Avenue.

k. The Army is currently conducting an air study in residential areas outside the southern Site boundary in areas of known or suspected groundwater contamination. The samples of soil gas collected in August 2014 shows elevated levels of several contaminants, including: 1,2,4-trimethylbenzene 190 ug/m³; 1,3,5-trimethylbenzene 280 ug/m³; 1,2-dichloropropane 280 ug/m³; benzene 45 ug/m³; carbon disulfide 12 ug/m³; chloroform 12 ug/m³; cis-1,2-dichloroethene 11 ug/m³; ethylbenzene 82 ug/m³; methyl ethyl ketone 110 ug/m³; naphthalene 290 ug/m³; tetrachloroethene 33 ug/m³; toluene 650 ug/m³; trichloroethene 33 ug/m³; and xylene 560 ug/m³. These contaminants are consistent with the contaminants or class of contaminants found on the Fort Gillem property in various environmental media during previous investigations of Fort Gillem.

l. The Army's air study also includes air sampling inside homes and businesses as well as the ambient, or outside, air in residential areas adjacent to the southern boundary of the Site. Indoor air samples were collected in July, August and September, 2014 from several homes in this area.

m. The study described in Paragraph 11.k and 11.l is on-going. Among the findings of the study to date are:

1. East of Joy Lake (FTG-7/10 area). Data is available and has been evaluated for eleven homes. Of those homes, EPA has determined:

a. At least four homes warrant prompt mitigation due to crawl space or indoor air concentrations above health-based benchmarks; three warrant additional monitoring, and four require further evaluation.

b. In four homes, 1,2,4-trimethylbenzene has been detected in the crawl space or indoor air above the established health-based benchmark of 14.6 ug/m³. The concentrations in these four homes range from 41 ug/m³ to 110 ug/m³. The concentrations in sub-slab and crawl space of these homes is higher than the air in the

homes. TCE, 1,3,5-trimethylbenzene, benzene and chloroform also contribute to the risk in some homes. TCE is present in one home in this area at 1.8 ug/m³.

c. The chemical 1,2,4-trimethylbenzene is present at elevated concentrations in soil gas (44 ug/m³ to 190 ug/m³).

2. West of Joy Lake (FTG-09 area). Data is available and has been evaluated for eight homes. Of those homes, EPA has determined:

a. At least six homes warrant prompt mitigation due to crawl space or indoor air concentrations above health-based benchmarks; 2 warrant additional monitoring.

b. Six homes in the FTG-09 study area had concentrations of 1,2,4-trimethylbenzene detected in the crawl space or indoor air above the established health-based benchmark of 14.6 ug/m³. The concentrations in these six homes range from 22 ug/m³ to 69 ug/m³. TCE, tetrachloroethene, trichloroethane, dichloroethane, cis-1,2-dichloroethene, methylene chloride, xylene, hexane and naphthalene also contribute to the risk in some homes. TCE is present in at least 6 homes in this area, ranging from 0.2 ug/m³ to 2.9 ug/m³.

c. 1,2,4-trimethylbenzene is present at elevated concentrations in soil gas (13 ug/m³ to 140 ug/m³).

d. Trichloroethene was detected at 2 micrograms/m³ in an ambient (outside) air sample.

12. **Gillem Enclave Area. General Description.** The Gillem Enclave Area includes several identified areas where the past waste handling activities have resulted in the contamination of soil and groundwater, including FTG-04 and FTG-13. FTG-04 includes the Solvent Disposal Pit and the Building 900 Area. FTG-13 is the Western Sewage Treatment Plant (WSTP).

a. The Solvent Disposal Pit has been identified as a source of chlorinated solvents and other synthetic organic compounds which have been released into the soil and groundwater as a result of past operations. Approximately 1,000 cubic yards of petroleum hydrocarbon and solvent-contaminated soil have been excavated from the Solvent Disposal Pit.

b. The now-removed 900 Building was the largest building in the 900 area industrial complex. The building served as one of the former depot's locations of aircraft maintenance. Wastes from the activities in the 900 depot building may have also been discharged into the Solvent Disposal Pit.

c. A 1995 investigation (Expanded Site Inspection) concluded that the 900 Building floor drain system and the Solvent Disposal Pit were sources of VOCs contamination to the shallow aquifer. Trichloroethene was detected at 512 ug/l in the groundwater, which is above Safe Drinking Water Act Maximum Contaminant Levels (MCLs) of 5 ug/l. *Draft Summary of Findings Report, 900 Area Solvent Disposal Pit, June 2001.* In addition, groundwater was

detected at the facility boundary in excess of the MCL. *FY05 Fort Gillem, Atlanta, Georgia, Installation Action Plan.*

d. The Western Sewage Treatment Plant, located in the northern part of the Gillem Enclave, was in operation from 1951 to 1978. The waste streams entering Western Sewage Treatment Plant (WSTP) consisted mainly of sanitary waste from post operations. However, during the early 1970s, the WSTP intermittently received industrial waste diverted from the Industrial Waste Treatment Plant. A 1994 investigation (Expanded Site Inspection) showed localized, elevated levels of petroleum hydrocarbons and elevated trichloroethene in the soil gas in this area. Tetrachloroethene was detected in a sludge drying bed. In groundwater, trichloroethene above MCLs was detected at the WSTP and at the installation (now the Gillem Enclave) boundary, and was also found in bedrock and saprolite (the weathered soil zone). Solvents were detected in surface water off the installation and north of the WSTP.

e. At least two groundwater plumes of trichloroethene and other VOCs are known to have migrated from the Enclave portion of the former Fort Gillem, northward into nearby residential areas outside of the Site boundary. The plumes are associated with the former solvent disposal pit and a former western sewage treatment plant (FTG-04 and FTG-13). The areal extent of each plume is unknown. There is potential for trichloroethene and other site-related contaminants to migrate into homes and other buildings, discharge into ambient air and discharge into local surface water (springs, creeks, streams).

f. As the ongoing air study at the North Landfill Area and the South East Burial Sites at the Site demonstrates, where the handling of waste materials in support of the former Fort Gillem mission has resulted in the contamination of soil and groundwater, it is likely to be associated with elevated levels of contaminants in the soil vapor, and in some cases ambient (outdoor) air and the air inside the homes in adjoining neighborhoods. The sampling of homes in both the Northern (NLA) and Southeastern (SEBS) study areas has revealed the presence of those contaminants inside the homes above health-based levels. A study of the neighborhoods adjoining the Enclave Area to determine the current risks to residents is, therefore, warranted.

13. Summary. Hazardous constituents present in soils, sediments, surface water and groundwater at the Site include the constituents described in the above paragraphs. These constituents have been identified in the soils, sediments, surface water, groundwater, and soil vapor onsite. In addition, these constituents have been identified in the soils, sediments, surface water, groundwater, soil vapor, indoor air and ambient air in and around residential properties near the Facility.

a. Exposure to these hazardous constituents may present an actual or potential harm to human health or the environment through pathways including direct contact with soil and sediments, through ingestion of surface water or groundwater, or inhalation of vapors found inside the home (indoor air) or outside the home (ambient air). A summary of the health effects associated with some of these substances is appended to this Order as Appendix B and incorporated herein by reference.

b. Indoor air may come to be contaminated by vapor intrusion from contaminated subsurface material, including contaminated soil, contaminated soil gas or contaminated groundwater. Indoor air can also be contaminated by ambient air entering a building. Ambient air can become contaminated by migration of soil vapors into the ambient air, or by discharge of contaminated groundwater to the surface such as springs, ditches, creeks, streams and lakes. Ambient air can also be impacted by discharge of volatile organic compounds directly to the air.

c. Potential pathways of exposure to groundwater and vapors emanating from groundwater contaminants in the residential setting adjacent to the Facility include: direct inhalation of volatile organic compounds intruding from contaminated groundwater into residences and ingestion, dermal absorption and inhalation of contaminated groundwater and vapors from wells. Where contaminated groundwater discharges to the surface water via springs, streams, lakes and other surface water bodies, potential pathways of exposure include direct inhalation of chemical vapor from surface water and into ambient air and dermal absorption of contaminated surface water. Potential pathways of exposure to soil contaminants in the residential setting adjacent to the Facility include: direct inhalation of chemical vapor intruding from contaminated subsurface soil (soil vapor) into residences and ambient air.

d. Receptors who must be considered in this residential setting include adults and children, with sensitive populations in women of child-bearing age and pregnant women. In addition, both young children and the elderly may be included in a sensitive population group.

e. Contaminants related to the former Fort Gillem site have been found in the soil gas, groundwater, surface water and air in the neighborhoods adjoining the former Fort Gillem, which is the study area discussed in Paragraphs 10.j – 10.l and 11.k – 11.m. Contaminants in indoor air in some homes in the residential area surrounding the former Fort Gillem exceed the levels that require mitigation.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

14. Respondent is a Federal Agency of the United States, as defined in Section 1004(4) of RCRA, 42 U.S.C. §6903(4).

15. Respondent is a "person" as defined in Section 1004(15) of RCRA, 42 U.S.C. § 6903(15).

16. The term "solid waste" is defined at Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), as "any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities."

17. The term "hazardous waste" is defined at Section 1004(5) of RCRA, 42 U.S.C. § 6903(5) as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical or chemical or infectious characteristics may pose a substantial threat or potential

hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.”

18. The term “disposal” is defined at Section 1004(3) of RCRA, 42 U.S.C. 6903(3), as “the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.”

19. RCRA Section 7003(a), 42 U.S.C. § 6973(a), specifies that when receiving evidence that the past or present handling, storage, treatment, transportation, or disposal of any solid waste or hazardous waste may present an imminent and substantial endangerment to health or the environment, EPA may issue an order against “any person” who has contributed or is contributing to such handling, storage, treatment, transportation, or disposal of the solid waste or hazardous waste.

20. Respondent is a department of the executive branch of the Federal Government and is subject to the requirements of Section 6001 of RCRA, 42 U.S.C. § 6961.

21. Based on the foregoing Section IV Findings of Fact, EPA has determined that material disposed of in burial trenches, pits, soil and groundwater at the Site is “solid waste” within the meaning of Section 1004(27) of RCRA, 42 U.S.C. § 6903(27).

22. Based on the foregoing Section IV Findings of Fact, EPA has determined that at least some of material disposed of in burial trenches, pits, soil and groundwater at the Site is “hazardous waste” within the meaning of Section 1004(5) of RCRA, 42 U.S.C. § 6903(5).

23. Based on the foregoing Section IV Findings of Fact, and pursuant to Section 7003(a) of RCRA, 42 U.S.C. § 6973(a), EPA has determined that Respondent contributed to the handling, storage, treatment, transportation or disposal of solid waste and/or hazardous waste at the Site.

24. Based on the foregoing Section IV Findings of Fact, and pursuant to Section 7003(a) of RCRA, 42 U.S.C. § 6973(a), EPA has determined that Respondent’s handling, storage, treatment, transportation, or disposal of solid waste and/or hazardous waste at the Site may present an imminent and substantial endangerment to public health.

25. The work required by this Order is necessary to protect public health within the meaning of Section 7003(a) of RCRA, 42 U.S.C. § 6973(a).

VI. ORDER

26. Based on the foregoing Findings of Fact, Conclusions of Law and Determinations, and the full administrative record, and pursuant to the authority in Section 7003 of RCRA, 42 U.S.C. § 6973, EPA has determined that the activities required by this Order are necessary to protect human health and/or the environment. IT IS HEREBY ORDERED that Respondent perform all

actions required by this Order and comply with all provisions in this Order and any document or plan developed under this Order. Respondent shall fully cooperate with EPA representatives in carrying out all actions required by this Order as well as all provisions in this Order.

VII. WORK TO BE PERFORMED

27. General Description of Work to be Performed. The work required by this Order evaluates whether indoor and/or ambient air in residential and other properties surrounding the former Fort Gillem contains hazardous constituents, documents the levels of such constituents, determines the level of risk posed by those constituents to the residents, owners, employees, students and invitees of the properties surrounding the former Fort Gillem, and mitigates any unacceptable risk to those persons. In addition, the work required by this Order identifies all private drinking water wells and springs in the area covered by this Order, evaluates whether wells or springs surrounding the former Fort Gillem contain hazardous constituents, documents the levels of such constituents, and takes all appropriate action to expeditiously mitigate any unacceptable risks to persons using such wells or springs.

28. Well and Spring Survey. Within twenty-one (21) days of the Effective Date of this Order, Respondent shall conduct and submit to EPA a survey of all water wells and springs (any groundwater discharges to surface) within the area depicted in Appendix C. The area to be surveyed is 2,000 feet north of the northern perimeter at the former Fort Gillem; 2,000 feet north and 2,000 feet west of the north and west perimeters of the Facility toward Jonesboro Rd; 3,000 feet south from the south perimeter of the facility; and any additional areas as further directed by EPA. A well and spring survey is not required east of the east boundary of the Facility (Moreland Avenue). The well survey shall determine if residents within the areas of the off-site groundwater plumes [known or inferred plumes associated with FTG-01(west, central and east), FTG-09 and southeast burial sites, FTG-07/10 and southeast burial sites, FTG-04 and FTG-13)] have a private well, and must address details including: well location (Global Positioning System (GPS) coordinates), well depth, well construction, age and condition, and use(s). Points of groundwater discharge to surface water, such as natural springs and seeps, shall be identified, including location, condition and uses.

29. Well Sampling. Within fifteen (15) days after submitting the well survey as described in Paragraph 28, Respondent shall sample and analyze water from all such wells from the survey in Paragraph 28 for volatile organic compounds by EPA method 8260B, including all compounds that can be determined by 8260B and all compounds amenable to analysis by 8260B, and shall, within 45 days after submitting the well survey, report the results of such sampling and analysis to EPA.

30. Provision of Alternate Water Supplies. The Army shall, immediately upon receiving sampling results, supply an alternate drinking water source to any resident who is not otherwise connected to the city water supply by connecting such resident to the city water supply, if contaminants are present in the resident's well above Maximum Contaminant Levels (MCLs) of the Safe Drinking Water Act or, in cases where an MCL has not been established, above health-

based levels, such as U.S. EPA Regional Removal Management Levels. Until such connection is demonstrated to EPA to be established, Respondent shall provide bottled water.

31. Spring Sampling. Within fifteen (15) days after submitting the spring survey as described in Paragraph 28, Respondent shall sample water and ambient air from all natural springs and seeps from the survey identified in Paragraph 28 for volatile organic compounds by EPA method 8260B, including all compounds that can be determined by 8260B and all compounds amenable to analysis by 8260B for water samples and volatile organic compounds by EPA method TO-15 for air samples. Respondent shall report the results of such sampling to EPA within 72 hours of obtaining the preliminary laboratory results. Ambient air samples shall be collected four to five feet above the point of groundwater discharge to the surface (breathing zone). The spring sampling shall determine if any identified springs contain volatile organic compounds and if those compounds are being released into ambient air.

32. Spring Work Plan. In the event that the sampling in Paragraph 31 indicates the presence of contaminants identified above in springs, Respondent shall, within sixty (60) days of submitting the spring survey to EPA, submit to EPA a Spring Work Plan to evaluate and address the contamination.

33. The Respondent shall continue to implement the *Final Vapor Intrusion Study Work Plan, Fort Gillem, FTG-01, FTG-07/10, FTG-09*, June 2014, (VI Study Work Plan), approved by Ga EPD on July 7, 2014 (Appendix D), as amended below, and shall implement the *Final Fort Gillem Response Action Outline, Technical Memorandum*, July 2, 2014 (Technical Memo, Appendix E).

34. Within 3 days of the Effective Date this Order, Respondent shall provide to EPA any already-existing data and consolidated reports generated to date during execution of the *VI Study Work Plan* and/or *Technical Memo* and any earlier investigations of the areas covered by this Order, not previously submitted to EPA.

35. Per this Order, EPA amends the VI Study Work Plan, as follows:

a. The *Technical Memorandum*, (Appendix E) is hereby made a part of the VI Study Work Plan and modifies the VI Study Work Plan.

b. Within fourteen (14) days of the Effective Date of this Order, Respondent must complete sample collection for the "set one" locations and "replacement" locations. "Set one" locations are specified in the VI Study Work Plan. "Replacement" locations are listed in Appendix F.

c. Within thirty (30) days of the Effective Date of this Order, Respondent must propose to EPA for its review and approval "set two" sample locations, per the VI Study Work Plan and EPA's previous guidance on selecting "set two" locations.

d. Within twenty-one (21) days of the Effective Date of the Order, Respondent must submit to EPA for its review and approval a revised schedule for conducting the sampling under the Order which expedites implementation of the Fort Gillem Vapor Intrusion Study. The revised

schedule shall include an acceleration of the schedule for collecting "set two" data. For "set two" sample locations and any other future residential air sampling, potential sources of indoor air contamination will be evaluated and removed from the homes or other buildings prior to collection of air samples.

e. Within seven (7) days of the Effective Date of this Order, Respondent shall submit to EPA for its review and approval a Mitigation Plan, as referenced in Section 5.6 of the VI Study Work Plan, to address the mitigation measures that will be utilized at impacted buildings or outdoor areas, including an Operation and Maintenance Plan for any mitigation systems.

f. Ensure that the VI Study Work Plan is consistent with EPA guidance on community involvement plans, including *Superfund Community Involvement Handbook (April 2005)*, EPA 540-K-05-003. Additional community involvement tools are available at:
<http://www.epa.gov/superfund/community/toolkit.htm>

36. Respondent shall initiate mitigation measures no later than seven (7) days of the Effective Date of this Order or twenty-one (21) days of receipt of the data, whichever is later, for:

a. any residential property with indoor air, including crawl space air, or any ambient air location, with concentrations of contaminants at or above the "Tier II Vapor Intrusion Screening Level (VISL) Target Indoor Air Concentrations" established in the July 2, 2014 Technical Memorandum, "Final Fort Gillem Response Action Outline" Table 1, Appendix E of this Order; and

b. any residential property with indoor air, including crawl space air, or any ambient air location, with concentrations of contaminants with a cumulative cancer risk due to multiple contaminants of 1×10^{-4} or hazard index of 3 for any single target organ.

37. Respondent shall initiate mitigation measures no later than (7) days of the Effective Date of this Order or twenty-one (21) days of receipt of the data, whichever is later, for any non-residential property where sampling data indicates concentrations in indoor air, including crawl space air, or ambient air of contaminants at or above the cumulative cancer risk due to multiple contaminants of 1×10^{-4} or hazard index of 3 for any single target organ.

38. Within three (3) days of receipt of analytical data obtained under the VI Study Work Plan, whether obtained before or after the Effective Date of this Order, Respondent shall submit the analytical data to the EPA.

39. Within three (3) days of receipt of analytical data, Respondent shall evaluate the data for residential buildings, identify homes with indoor air concentrations that meet or exceed one or more "Tier I Evacuation Level Air Concentration" or "Tier II VISL Target Indoor Air Concentration" level (Appendix E) and submit this information to EPA.

40. Within twenty-four (24) hours of data evaluation described in paragraph 39, Respondent must evacuate or mitigate any home for which indoor air meets or exceeds an immediate action level, as described in "Tier I Evacuation Level Air Concentration" (Appendix E).

41. Within fifteen (15) days of the Effective Date of this Order, Respondent shall submit for EPA review and approval a work plan to study the ambient air, indoor air, subslab and crawl space air and soil gas for the off-site areas associated with FTG-13 and FTG-04 (Gillem Enclave). The off-site study area shall include residential areas overlying the known or suspected groundwater plumes associated with FTG-4 (solvent disposal pit) and FTG-13 (Western Sewerage Treatment Plant). The air study shall determine if residences, offices, schools, nursing homes, businesses, etc. in proximity to the former Fort Gillem and, specifically, near the areas identified as FTG-04 and FTG-13, are being exposed to site related VOC contaminants in indoor air, and must address details including: crawl space and sub-slab air monitoring, indoor air monitoring, ambient air and soil gas monitoring. Once approved by EPA, Respondent shall immediately implement this work plan and take action as scheduled within the approved work plan.

42. Within sixty (60) days of the Effective Date of this Order and semi-annually thereafter until the work required by this Order is complete, Respondent shall send to all residents living in neighborhoods adjoining the Site a newsletter providing current information regarding studies and cleanup actions underway to address the off-site VOC contamination.

43. Within thirty (30) days of the Effective Date of this Order or thirty (30) days of receipt of data, whichever is earlier, Respondent shall transmit via U.S. mail a notice letter to each resident and/or owner of property that was sampled. The notice letter shall be consistent with the EPA Region 4 *Standard Operating Procedure for Communicating Environmental Data to Property Owners and Tenants*, October 2010 (Appendix G) advising residents of the findings from the air or water sampling, potential hazards associated with the air or water, and advising them of any mitigation or other actions planned. Prior to transmitting any notice letter, Respondent shall submit notice letter to EPA for its review and approval. The letters shall be provided to EPA at the time they are transmitted to the resident or owner.

44. Respondent shall immediately (within 72 hours of receipt of data) notify residents in homes with indoor air concentrations at or above the Tier 1 thresholds for immediate action. Such notification shall describe the specific contaminants that pose a risk to human health at the notified household and any actions that will be taken to address those contaminants. Tier I levels are listed in the Technical Memorandum (Appendix E).

45. Within ten (10) days of receipt of data, Respondent shall notify residents when contaminants are found in their homes at indoor air concentrations greater than the Tier II levels. The notification will describe the specific contaminants found in their indoor air that exceed Tier II levels, and any mitigation actions that will be taken. Tier II levels are listed in the Technical Memorandum (Appendix E).

46. Within sixty (60) days of the Effective Date of this Order, Respondent shall issue, by publication in a local newspaper of general circulation, a written warning concerning use of contaminated well water for drinking (ingestion) purposes using the language and general content described in 40 CFR §141.32. This notice shall indicate that Respondent is providing a permanent hook-up to a public drinking water source to residences in the well survey area (described in paragraph 28) whose wells have been tested and have been shown to exceed health-based standards for drinking water. The notice shall also state that homes and other buildings in the neighborhoods adjoining the former Fort Gillem are being evaluated for the presence of air contaminants, and that the Army will be taking actions to mitigate exposure to elevated levels of air contaminants. Additionally, Respondent shall include in the public notice that an Administrative Order has been issued by the EPA. The notice shall be published every six months beginning within thirty (30) days of the Effective Date of the Order until work required by the Order is complete and the Order is closed.

47. Within sixty (60) days of the Effective Date of this Order, Respondent shall submit to EPA for review and approval a Land Use Control Implementation Plan, which will describe the need for any long-term land use controls to ensure that the current and/or future use of the property covered by this Order is consistent with protection of human health, the objective of such land use controls, and the specific land use controls that will be utilized.

48. All work undertaken pursuant to this Order shall be performed in accordance with the EPA-approved terms and schedules, and in a manner consistent with EPA's *Field Branches Quality System and Technical Procedures*, which is available at: <http://www.epa.gov/region4/sesd/fbqstp/>, including, but not limited to, SESDPROC-305-R3 and SESDPROC-307-R3. All investigative, sampling and analytical work undertaken pursuant to this Order shall be performed in accordance with an EPA-approved quality assurance project plan consistent with the *Uniform Federal Policy for Quality Assurance Project Plans*, March 2012.

49. Within ten (10) days of the Effective Date of this Order, Respondent shall notify the EPA Project Coordinator in writing of the name, title, and qualifications of the engineer, hydrologist, geologist, or environmental scientist who will direct the project and of any contractors or consultants and their personnel to be used in carrying out the terms of this Order.

50. All work performed pursuant to this Order shall be under the direction and supervision of a Professional Engineer, hydrologist, geologist or environmental scientist with expertise in hazardous materials sampling/removal/hazardous waste cleanup and/or corrective action. Respondent's contractors and consultants shall have the technical expertise sufficient to adequately perform all aspects of the work for which it is responsible.

51. Within sixty (60) days of Respondent's completion of the work required under this Order, Respondent shall submit for EPA review and approval a report documenting such completion.

52. Meetings. Once the Order is effective, the EPA may, at its discretion, schedule meetings with Respondent to discuss the Order. These meetings may, at EPA's discretion, include other stakeholders.

53. Monthly Progress Reports. In addition to the other deliverables and reports required by this Order, Respondent shall provide monthly progress reports to the EPA by the 15th day of each month. At a minimum, the monthly progress reports shall (1) describe the actions which have been taken to comply with this Order during the preceding month, (2) describe any work required by this Order that is planned for the next two months and the schedules relating to such work, and (3) describe all problems encountered, any anticipated problems, any actual or anticipated delays, and solutions developed and implemented to address any actual or anticipated problems or delays.

54. Off-Site Shipment of Waste Material. "Waste material" shall mean any "hazardous substance" as defined under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), any pollutant or contaminant as defined under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33), or any "solid waste" as defined under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27). Respondent shall, prior to any off-site shipment of Waste Material from the Site or from any area on which work was performed under this Order to an out-of-state waste management facility, provide written notification of such shipment of Waste Material to the appropriate state environmental official in the receiving facility's state and to EPA's Designated Project Manager. In shipping Waste Material off-site, Respondent shall comply with all applicable legal requirements, including RCRA's hazardous waste determination requirements and land disposal restrictions. Before shipping any Waste Material to an off-site location:

a. Respondent shall include in the written notification the following information: (1) the name and location of the facility to which the Waste Material is to be shipped; (2) the type and quantity of the Waste Material to be shipped; (3) the expected schedule for the shipment of the Waste Material; and (4) the method of transportation. Respondent shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

b. The identity of the receiving facility and state will be determined by Respondent following the award of the contract for performing the work under this Order. Respondent shall provide the information required by Subparagraphs 54.a and 54.c as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

c. Respondent shall obtain EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondent shall only send Waste Material from the Site to an off-site facility that complies with the requirements of the statutory provision and regulation cited in the preceding sentence.

VIII. EPA APPROVAL OF PLANS AND OTHER SUBMISSIONS

55. All plans, reports, and other deliverables, required by this Order shall be submitted by Respondent for EPA's review and approval in accordance with this Section. Two hard copies

and one electronic copy of all deliverables shall be submitted to the EPA and one hard copy and one electronic copy of all deliverables shall be submitted to the Ga EPD. After review of any plan, report, or other item submitted by Respondent for approval pursuant to this Order, EPA shall notify Respondent that it either (a) approves the submission; (b) approves the submission with specified conditions; (c) disapproves, in whole or in part, the submission and directs that Respondent modify the submission; (d) will modify the submission to cure deficiencies and provide it to Respondent for implementation; or (e) any combination of the above.

56. In the event of approval, approval upon conditions, or EPA modification of a plan, report, or submission, Respondent shall proceed to take any action required by the plan, report or other item, as approved or modified by EPA. Following EPA modification or approval of a submittal or portion thereof, Respondent shall not thereafter alter or amend such submittal or portion thereof unless directed by EPA.

57. Upon receipt of a notice of disapproval, Respondent shall, within fourteen (14) days (or such longer time as specified by EPA in this Order or in such notice), correct the deficiencies and resubmit the plan, report, or other item for approval. Notwithstanding the receipt of a notice of disapproval, Respondent shall proceed to take any action required by any non-deficient portion of the submission, unless otherwise directed by EPA.

58. If EPA disapproves a resubmitted plan, report or other item, or portions thereof, EPA may again direct Respondent to correct the deficiencies. Consistent with Paragraph 55 above, EPA shall also retain the right to modify the plan, report or other item, and Respondent shall implement any such plan, report or item as corrected or modified.

59. If upon resubmission, a plan, report, or item is disapproved or modified by EPA because of a material defect, Respondent shall be deemed to have failed to submit such plan, report or item timely and EPA may deem any such failure a violation of this Order.

60. All plans, reports and other items submitted to EPA under this Order shall, upon approval or modification by EPA, be incorporated into and enforceable under this Order. In the event EPA approves or modifies a portion of a plan, report or other item submitted to EPA under this Order, the approved or modified portion shall be incorporated into and enforceable under this Order.

61. Respondent is responsible for preparing deliverables acceptable to EPA. Neither failure of EPA to expressly approve or disapprove of Respondent's submissions within a specified time period, nor the absence of comments, shall be construed as approval by EPA.

IX. ADDITIONAL WORK

62. EPA may determine, or Respondent may propose, that certain tasks, including additional investigatory work or modifications to procedure or methodology, are necessary in addition to or in lieu of the tasks included in Section VII of this Order to meet the purposes set forth in this Order. If EPA determines that additional work is necessary, EPA will specify in writing the basis for its determination. Within thirty (30) days after the receipt of such determination,

Respondent shall have the opportunity to meet or confer with EPA to discuss the additional work. If required by EPA, Respondent shall submit for EPA approval a work plan for the additional work. Such work plan shall be submitted within thirty (30) days of receipt of EPA's determination that additional work is necessary, or according to an alternative schedule established by EPA. Upon approval of a work plan, Respondent shall implement such work plan in accordance with the schedule and provisions contained therein.

X. QUALIFICATIONS OF RESPONDENT'S PERSONNEL AND AGENTS

63. All work performed by Respondent pursuant to this Order shall be under the direction and supervision of individual(s) who have demonstrated expertise in hazardous waste and site investigations and remediation, as described in Paragraph 50. In addition, Respondent shall ensure that in any circumstance in which a license is required, only licensed individuals shall be retained to perform any work required under this Order.

XI. PUBLIC REVIEW OF ADMINISTRATIVE RECORD

64. The Administrative Record supporting the issuance of this Order and any written decisions or determinations made by EPA pursuant to this Order will be available for public review by contacting the EPA Project Manager, Cathy Amoroso, at:

U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30021
Phone: (404) 562-8637

XII. ON-SITE AND OFF-SITE ACCESS

65. Nothing in this Order shall be construed to limit or otherwise affect EPA's right of access and entry pursuant to any applicable laws and regulations, including RCRA and CERCLA.

66. Nothing in this Order shall be construed to limit or otherwise affect Respondent's liabilities and obligations to perform the directed actions, including actions beyond the Site boundary, notwithstanding lack of access. EPA may determine that additional measures must be taken to address releases beyond the Site boundary if access to off-site areas cannot be obtained.

67. Respondent shall make available to EPA for inspection, copying or photographing, all records, files, photographs, documents or any other writing, including monitoring and sampling data (including raw data, upon EPA request) that pertain to any work undertaken pursuant to this Order.

XIII. RETENTION OF RECORDS

68. Respondent shall preserve for a minimum of ten (10) years after termination of this Order all data, records and documentation in its possession or in the possession of its divisions, officers, supervisors, employees, agents, contractors, successors, and assigns which relate in any way to this Order or to solid or hazardous waste management at the Site. Respondent shall make such records available to EPA at its request. Respondent shall also maintain records pertaining to the work being performed pursuant to this Order and shall make such records available to EPA for inspection upon request.

XIV. PROJECT MANAGERS

69. The EPA designates as its Project Manager for this Order:

Cathy Amoroso
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30021
Phone: (404) 562-8637

EPA reserves the right to change the designated Project Manager at any time, and will provide notice to Respondent should such change occur.

70. Within ten (10) days after the Effective Date of this Order, Respondent shall designate a Project Manager and the name of at least one individual as an alternate who may function in the absence of the designated Project Manager. Respondent's Project Manager shall be responsible for overseeing the implementation of this Order. Respondent may change its designated Project Manager after providing written notice of such change to EPA, including the appropriate contact information for the new designated Project Manager.

XV. NOTICES

71. For purposes of this Order, all written communications, notices or submissions required by this Order shall be directed to a person specified by each party. EPA hereby designates its Project Manager to receive all notices required under this Order.

72. Within five (5) days after the Effective Date of this Order, Respondent shall designate a person to receive such written communications, notices, or responses to submissions required by this Order and shall provide a mailing address for such person.

73. Any notice, report, certification, data presentation, or other document submitted by Respondent pursuant to this Order which discusses, describes, demonstrates, or supports any finding or makes any representation concerning Respondent's compliance or noncompliance with any requirement of this Order shall be certified by a duly authorized representative of

Respondent. A person is a "duly authorized representative" only if: (1) the authorization is made in writing; (2) the authorization specifies either an individual or position having responsibility over the work to be performed pursuant to this Order, and (3) the written authorization is submitted to the Project Manager designated by EPA, in accordance with Section XIII of this Order. The certification required by this Paragraph shall be in the following form:

I certify that, to the best of my knowledge and belief, the information contained in this written certification and in any documents accompanying this certification is true, accurate and complete.

In making this statement, where I have not made an independent review of all statements contained therein, I have relied in good-faith on information, statements, and representations furnished to me by employees or contractors of the U.S. Army. Based on my inquiry of the person or persons (or the supervisors of such persons) directly responsible for gathering the information contained in this written certification and in any documents accompanying this certification, this document is, to the best of my knowledge and belief, true accurate and complete. I am aware that there are significant potential penalties for submitting materially false information, including the possibility of fines and imprisonment for knowing violations.

Signature:

Name:

Title:

XVI. RESERVATION OF RIGHTS

74. EPA expressly reserves, without limitation, all of its statutory and regulatory powers, authorities, rights, remedies and defenses, both legal and equitable, which it may have.

75. EPA expressly reserves all rights that it may have, including the right to disapprove of work performed by Respondent pursuant to this Order, to require Respondent to correct any work disapproved by EPA, and to direct Respondent to perform tasks in addition to those required pursuant to this Order.

76. This Order shall not be construed as a covenant not to sue, or as a release, waiver, or limitation of any claims, rights, remedies, defenses, powers and/or authorities which EPA has under RCRA, CERCLA, or any other statutory, regulatory or common law authority of the United States.

77. This Order shall not limit or otherwise preclude EPA from taking any additional legal action against Respondent should EPA determine that any such additional legal action is necessary or warranted.

78. Notwithstanding compliance with this Order, Respondent is not released from any claims EPA may have for costs, and EPA reserves the right to seek reimbursement from Respondent for any such costs it incurs. Compliance with this Order shall not relieve Respondent of its obligations to comply with RCRA or any other applicable local, state, or federal laws and regulations.

XVII. OTHER APPLICABLE LAWS

79. Respondent shall undertake all actions required by this Order in accordance with the requirements of all applicable local, state, and federal laws and regulations. Respondent shall obtain all required permits or approvals as necessary to perform the work required by this Order.

80. Any reports, plans, specifications, schedules, or other submissions, including any attachments thereto, required by this Order are, upon written approval by EPA, incorporated into this Order. Any noncompliance with such EPA-approved reports, plans, specifications, schedules, and attachments shall be considered a violation of this Order.

81. No informal advice, guidance, suggestions or comments by EPA regarding reports, plans, specifications, schedules, or any other writings submitted by Respondent shall be constructed as relieving Respondent of its obligations to obtain written approval, if, and when, required by this Order.

XVIII. OPPORTUNITY TO CONFER

82. Should the Army wish to confer with the EPA regarding this Order, either through submission of written materials or through a direct meeting, the Assistant Secretary of the Army must, within ten (10) days of Respondent's receipt of this Order, file a written request addressed to the EPA Assistant Administrator for the Office of Enforcement and Compliance Assurance (OECA) seeking an opportunity to confer. The opportunity to confer with the Administrator provided by Section 6001(b) of RCRA has been delegated to the Assistant Administrator of OECA. The written request should be served on the EPA Assistant Administrator with a copy to the Director of EPA's Federal Facilities Enforcement Office and the Regional Counsel for EPA Region 4. A letter requesting a direct meeting should specifically identify those issues which the Respondent wishes the EPA Assistant Administrator to consider.

83. If Respondent requests a direct meeting, the EPA Assistant Administrator for OECA will contact the Assistant Secretary of the Army to convene a meeting as soon as possible.

84. After a direct meeting or receipt of written materials, the EPA Assistant Administrator for OECA will issue a written decision with appropriate instructions regarding the finality of this Order. This decision shall be made part of the Administrative Record for the Order.

XIX. ENFORCEMENT

85. The failure of Respondent to comply with any provision of this Order shall be considered a violation of this Order.

XX. TERMINATION

86. This Order and all of its terms and provisions shall remain in effect until all of the activities called for by this Order are completed and Respondent is so notified in writing by EPA. Such notice shall be signed by the Director, RCRA Division, Region 4. Respondent may request that EPA Region 4 provide Respondent with such notice, and shall supply EPA with such information, including certifications, as EPA may specify.

XXI. GENERAL PROVISIONS

87. Nothing in this Order constitutes a satisfaction or release from liability with respect to any conditions or claims arising as a result of past, current or future operations, ownership or use of the Site by Respondent, its agents, officers, supervisors, directors, successors or assigns.

88. Nothing in this Order affects any right, claim, interest, defense, or cause of action of EPA with respect to Respondent or any third parties.

XXII. NOTICE OF NON-LIABILITY OF EPA

89. EPA shall not be deemed a party to any contract involving Respondent and relating to activities at the Site, and EPA shall not be liable for any claim or cause of action arising from or on account of any act, or the omission of Respondent, its officers, employees, contractors, receivers, trustees, agents or assigns, in carrying out the activities required by this Order.

XXIII. NOTICE OF INTENT TO COMPLY

90. Respondent shall notify EPA's Project Manager in writing of whether it intends to comply with this Order by no later than five (5) days after the Effective Date of this Order. Respondent shall be deemed in violation of this Order if it fails to provide written notification to EPA's Project Manager of Respondent's intent to comply within the time period noted above.

XXIV. ANTI-DEFICIENCY ACT

91. Nothing set forth in this Order shall require Respondent to violate the Anti-Deficiency Act, 31 U.S.C. § 1341 *et seq.*

XXV. MODIFICATION


92. If EPA determines that modification to the work specified in approved work plan(s) or other reports developed pursuant to this Order is necessary to achieve and maintain the Performance Standards or to carry out and maintain the effectiveness of the remedy set forth in the Final Decision, EPA may require that such modification be incorporated in the appropriate

work plan(s) or other reports. Respondent shall implement any work required by any modifications incorporated in the work plans or other reports developed pursuant to this Order.

XXVI. EFFECTIVE DATE

93. This Order shall become effective within eleven (11) days of Respondent's receipt of this Order if no conference with the EPA Assistant Administrator is requested pursuant to Section XVIII, above. If a conference with the EPA Assistant Administrator is requested in the time and manner provided in Section XVII above, this Order shall become effective to the extent, and within the time, specified in the EPA Assistant Administrator's decision.

IT IS SO ORDERED:

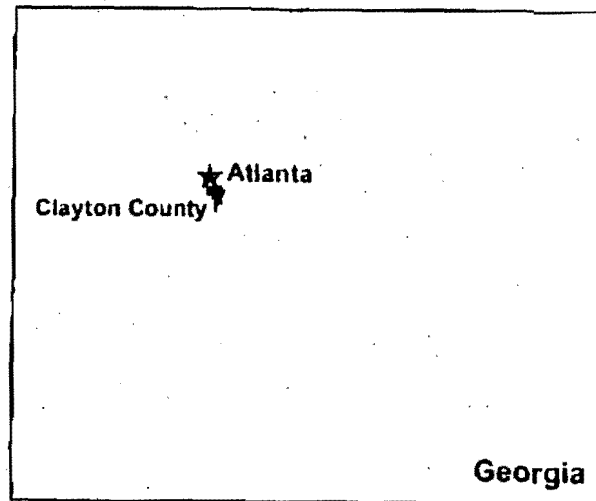
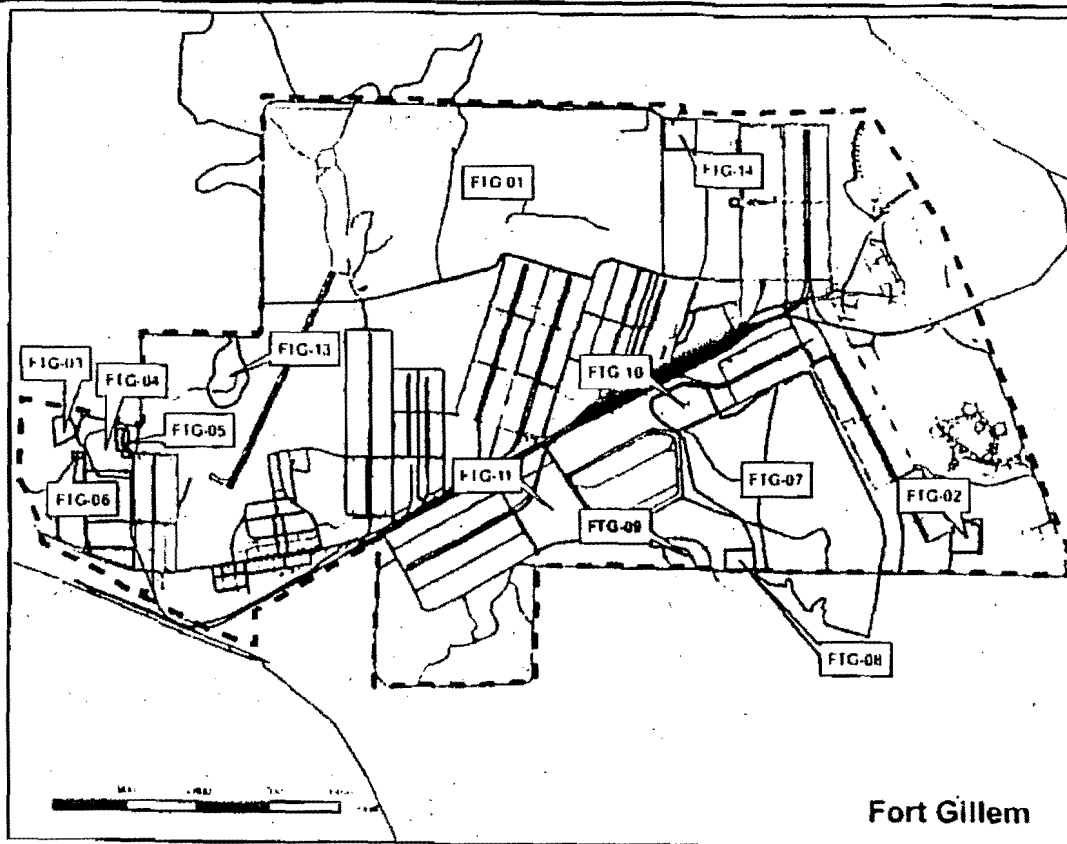
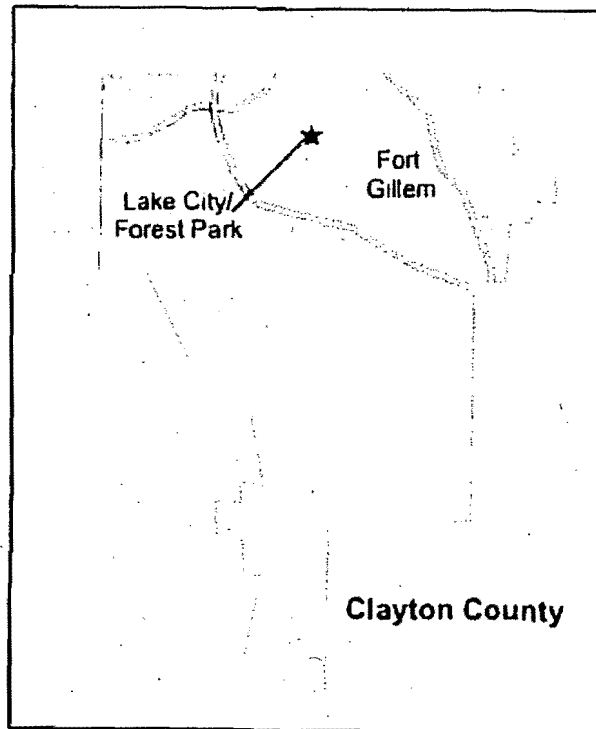


G. Alan Farmer
Director
RCRA Division
EPA Region 4

September 24, 2014
DATE

Appendix A

Ft. Gillem Facility Layout Map



Legend

- FIG-09 Study Area
- Fort Gillem Boundary
- Roads
- Railroads
- Streams
- Lakes and Ponds
- 900 Area
- Eastern Sewage Treatment Plant
- North Landfill Area
- Southeast Burial Sites
- Western Sewage Treatment Plant
- Buildings
- Site Boundary





**Figure 1-1
Location Map
Fort Gillem, Georgia**

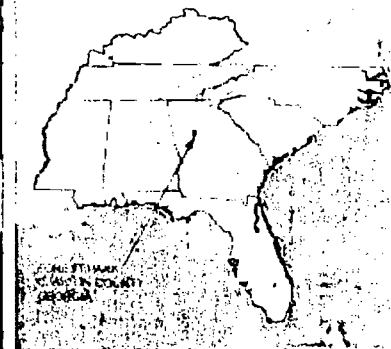
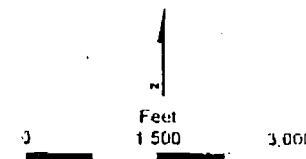
U. S. Army Corps of Engineers
Savannah District
Fort Gillem
Clayton County, Georgia
Contract No. DACA45-03-D-0029

Shaw Shaw Environmental, Inc.



Legend

-  Fort Gillem Defined Areas 2001
-  USA Fort Gillem Boundary
-  SEBS Southeastern Burial Sites
-  FTG Fort Gillem



United States Environmental Protection Agency

USA FORT GILLEM
FOREST PARK,
CLAYTON COUNTY,
GEORGIA
EPA ID: GA0210020046

FACILITY LAYOUT MAP



Appendix B

Health Effects of Contaminants Found at the Former Fort Gillem or Surrounding Property

APPENDIX B.

HEALTH EFFECTS OF CONTAMINANTS FOUND AT THE FORMER FORT GILLEM OR SURROUNDING PROPERTY

The following substances, a partial list, have the following health effects.

- a. Benzene is a volatile organic compound (VOC) and a known mutagen and carcinogen. Acute (short-term) exposure can affect the central nervous system, cause dizziness, headache, vomiting, visual disturbances, staggering gait, hilarity, fatigue, loss of consciousness, and respiratory arrest. Chronic exposure can cause hematological changes, including leukemia. EPA classifies benzene as a known/likely human carcinogen.
- b. Carbon tetrachloride (tetrachloro-methane) is a halogenated organic compound. Acute exposure can cause loss of consciousness, dizziness, vertigo, headache, depression, mental confusion, incoordination, nausea, vomiting, abdominal pain, diarrhea, and liver and kidney damage. Chronic exposure can cause liver and kidney damage, dermatitis, and pulmonary edema. Carbon tetrachloride is classified by EPA as "likely to be carcinogenic to humans."
- c. Chlorobenzene is an aromatic organic compound. Acute exposure can cause irritation of the eyes and nose, drowsiness, and incoordination. Chronic exposure can cause neurotoxicity, including numbness, cyanosis (depression of the respiratory center), hyperesthesia, muscle spasms, and liver and kidney damage. Chlorobenzene is known to bioaccumulate.
- d. Chloroform (trichloro-methane) is an organic compound. Exposure can cause dizziness, mental dullness, nausea, disorientation, headache, fatigue, anesthesia, and hepatomegaly. Chloroform is classified as a probable human carcinogen by EPA.
- e. 1,2-Dichloroethane, also called ethylene dichloride, is a manufactured chemical that is not found naturally in the environment. Exposure can affect the liver and the urinary system or kidneys. This compound is classified as a probable human carcinogen by EPA.
- f. Ethyl benzene is a VOC that is an eye irritant; at high concentrations, it causes narcosis. Ethyl benzene also causes liver and kidney damage and has embryotoxic and teratogenic effects.
- g. Methylene chloride (chloromethane) is an organic compound. Exposure to low concentrations can cause dizziness, incoordination, loss of balance, unconsciousness, and decreased performance in tests of sensory and motor functions. Chronic exposures and exposures to high concentrations can cause death, systemic, immunological, reproductive, developmental, genotoxic and carcinogenic effects. Exposure to high concentrations can cause narcosis and respiratory depression resulting in death. Inhalation can cause asthma, chronic bronchitis, headache, dizziness, drowsiness, unconsciousness, convulsions, and death. Methylene chloride can damage the liver and kidneys and can interfere with brain function. Methylene chloride is highly flammable and a dangerous fire hazard.
- h. Naphthalene is an organic compound. Acute exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Cataracts have also been reported in workers acutely exposed to

naphthalene by inhalation and ingestion. Chronic (long-term) exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Hemolytic anemia has been reported in infants born to mothers who "sniffed" and ingested naphthalene (as mothballs) during pregnancy. EPA has classified naphthalene as a Group C, possible human carcinogen.

i. Toluene is an aromatic hydrocarbon. Acute exposure can cause dermatitis, central nervous system excitation and depression, respiratory tract irritation, eye irritation, lacrimation, metallic taste, nausea, hilarity, lassitude, drowsiness, impaired balance, paresthesia, vision disturbances, dizziness, respiratory failure, and ventricle fibrillation. Chronic exposure can cause severe muscle weakness, cardiac arrhythmias, gastrointestinal, and neurophysical complaints.

j. Trichloroethylene (TCE) is a VOC. It is primarily used as an industrial solvent to remove grease from metal parts. Acute exposure can cause impaired heart function, unconsciousness, damage to nerve, kidneys, and liver, and can cause death. Chronic exposure can cause liver and kidney damage, impaired immune system function, impaired fetal development in pregnant women. EPA has determined that TCE is carcinogenic to humans.

k. 1,2-Dichloroethylene (DCE) is a VOC resulting from the byproduct of vinyl chloride production. It is used in solvents for cleaning purposes. Acute exposure can cause central nervous system depression which may lead to coma or death. Chronic exposure can cause damage to the liver, circulatory system and nervous system.

l. 1,1,2,2-Tetrachloroethane (TeCA) is a VOC that was used as an industrial solvent in paints and pesticides and also used to clean and degrease metals. Acute exposure can cause drowsiness, dizziness, nausea, vomiting, decreased blood pressure, and unconsciousness. Chronic exposure may cause liver damage and is classified as a likely human carcinogen by EPA.

m. Tetrachloroethene (PCE) is a VOC that is used in dry-cleaning of clothing and degreasing metals. Acute exposure can cause dizziness, headaches, poor balance, and reduce response time on behavioral tests. Chronic exposure can cause reduced scores on neurobehavioral or color vision tests, liver and kidney damage, reduced red blood cells, increase risk with reproduction, and may cause cancer.

n. Vinyl Chloride is a VOC that is used to make PVC pipes and other plastic products. Acute exposure can cause dizziness, sleepiness, and death. Chronic exposure can damage male reproductive system, liver and nerve damage, and develop immune reactions. EPA classifies vinyl chloride as a known/likely human carcinogen.

o. 1,1,2-Trichloroethane (TCA) is a VOC that is used to make synthetic fibers and plastic wraps. Acute exposure can cause excitation and sleepiness and affect the liver and kidneys. Chronic exposure can affect the immune system, liver, and kidneys.

p. 1,2,4-Trimethylbenzene is a VOC that is used as an aviation fuel additive, gasoline additive, solvent, paint thinner, sterilizing agent, and in manufacturing of dyes, perfumes, and resins. Acute exposure can cause headaches, fatigue, and drowsiness and can affect the nervous system. Chronic exposure may affect the reproductive system and developing fetus.

q. 1,3,5-Trimethylbenzene is a VOC that is used as a specialty solvent. Acute exposure can cause irritation to eyes, skin, nose, and throat, drowsiness, and vomiting. Chronic exposure can lead to chronic or asthmatic bronchitis, nervousness, tension, and anxiety.

r. 1,2-Dichlorobenzene, 1,3-Dichlorobenzene and 1,4-Dichlorobenzene are VOCs that are primarily used to control insects, moths, molds, and mildews. Acute exposure can cause irritation of the skin, eyes, and throat. Chronic exposure can affect the liver, skin, central nervous system.

s. Xylene is a VOC that is primarily used as a solvent and cleaning agent. Acute exposure can cause irritation of the skin, nose, eyes, and throat, difficulty in breathing, lung problems, delayed reaction times, memory difficulties, stomach discomfort, changes to the liver and kidneys, unconsciousness, and death. Chronic exposure can cause headaches, dizziness, confusion, changes in sense of balance, and lack of muscle coordination.

t. Methyl Ethyl Ketone (n-butanone) is a VOC that is commonly used as a solvent. Acute exposure can cause birth defects, loss of consciousness, and death. Effects of chronic exposure is unknown; however, repeated exposure can cause dermatitis, upset stomachs, loss of appetite, headaches, dizziness, and weakness.

u. Carbon disulfide is a VOC that is used to produce rubber chemicals and pesticides. Acute exposure can cause changes in breathing and chest pains. Chronic exposure can cause changes with the nervous system.

v. 1,1-dichloroethane (1,1 DCA) is a VOC that is used to make vinyl chloride. Acute exposure can cause irregular heartbeats and central nervous system depression. Chronic exposure can cause kidney damage. DCA is classified as a possible human carcinogen by EPA.

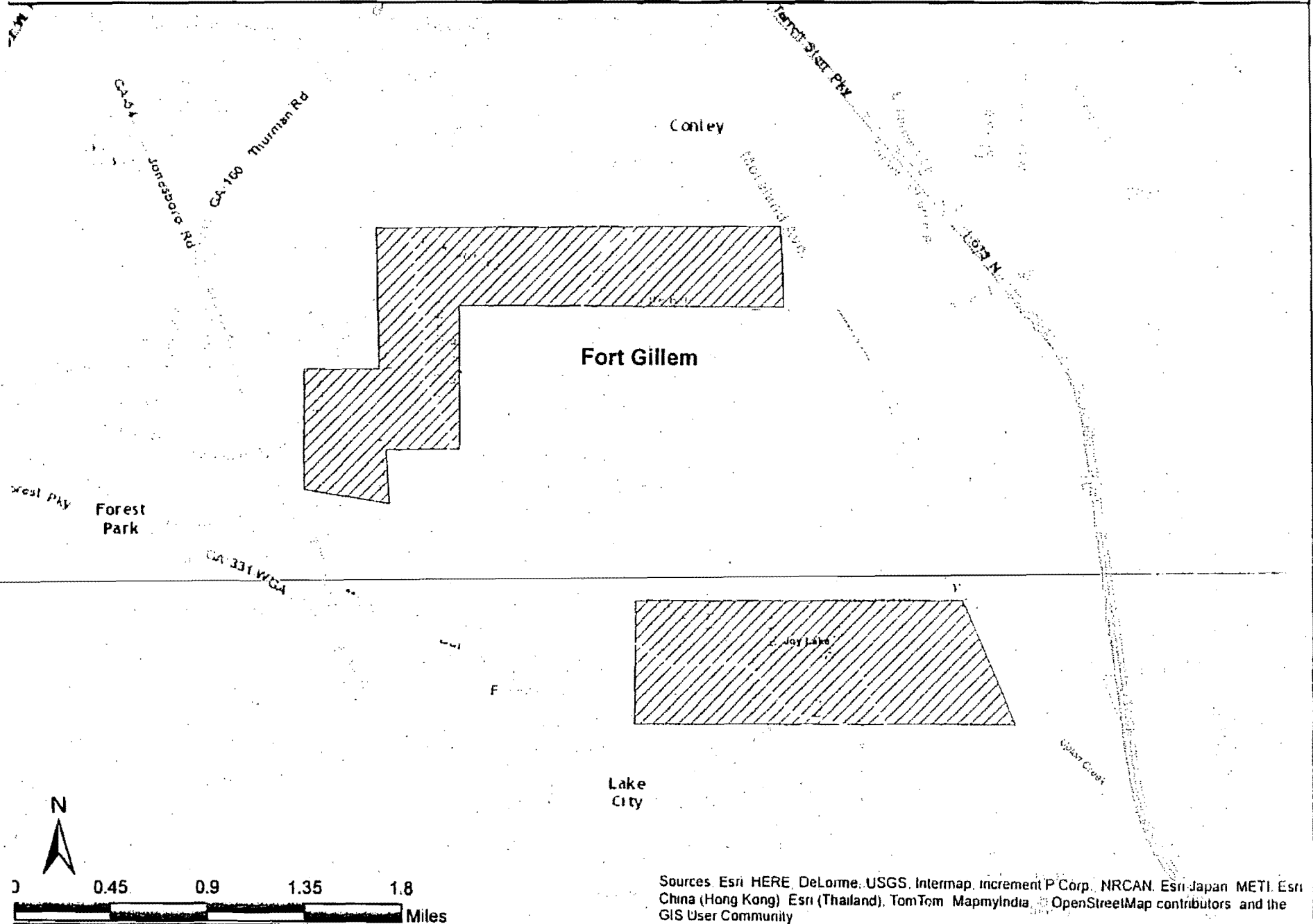
w. Cis-1,2-dichloroethene and trans-1,2-dichloroethene are VOCs that are used as a solvent for waxes and resins. Acute exposure can cause nausea, drowsiness, and death. Chronic exposure may cause nervous and circulatory system damage as well as liver damage.

x. 1,1-dichloroethene (1,1-DCE) is a VOC that is used to make adhesives and synthetic fibers. Acute exposure can cause loss of breath and fainting. Chronic exposure may cause damage to nervous system, liver, and lungs.

Appendix C

**Well and Spring Survey Area
Fort Gillem, Clayton County, Georgia**

Appendix C
Well and Spring Survey Area
Fort Gillem, Clayton County, Georgia

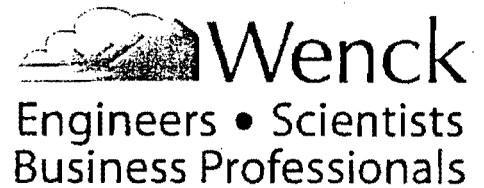


Appendix D

**Final Vapor Intrusion Study Work Plan
Fort Gillem, FTG-01, FTG-07/10, FTG-09**

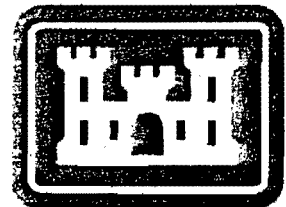
Clayton County, Georgia

June, 2014



FINAL
Vapor Intrusion Study Work Plan
Fort Gillem, FTG-01, FTG-07/10, FTG-09
Clayton County, Georgia
CTO Number: W912HN-13-D-0016
Delivery Order: 0003
June 2014

Prepared for:



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List of Acronyms

APP	Accident Prevention Plan
BEC	BRAC Environmental Coordinator
bg	Below Grade
BHHRA	Baseline Human Health Risk Assessment
BLRA	Baseline Risk Assessment
BRAC	Base Realignment and Closure
CIP	Community Involvement Plan
COC	Chain-of-Custody
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
DCE	Dichloroethylene
DDT	dichlorodiphenyltrichloroethane
DNAC	Decontamination Agent Non-Corrosive
DO	Dissolved Oxygen
DoD	Department of Defense
DPE	Dual Phase Extraction
EM	Engineering Manual
ESI	Environmental Site Investigation
FTG	Fort Gillem
FTL	Field Team Leader
FOSET	Finding of Suitability for Early Transfer
FOST	Finding of Suitability for Transfer
GAEPD	Georgia Environmental Protection Division
GIS	Geographical Information Systems
GPS	Global Positioning System
GUFPA	Georgia Utility Facility Protection Act
GWETS	Groundwater Extraction and Treatment System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCR	HCR Construction, Inc.
HSRA	Hazardous Site Response Act
ID	Identification
IDW	Investigation-Derived Waste
ILRA	Implementation Local Redevelopment Authority
IRA	Interim Remedial Action
MCL	Maximum Contaminant Level
ml	milliliters
MOU	Memorandum of Understanding
MS/MSD	Matrix Spike and Matrix Spike Duplicate
MW	Monitoring Well
NCP	National Contingency Plan
NGVD	National Geodetic Vertical Datum
O.D.	Outside Diameter
OSHA	Occupational Safety and Health Act
OU	Operable Unit
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene

POC	Point of Contact
POL	Petroleum, oil and lubricants
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
PWS	Performance Work Statement
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
SSHO	Site Safety & Health Officer
SSHP	Site Safety & Health Plan
SVOCs	Semi Volatile Organic Compounds
TCA	Trichloroethane
TCE	Trichloroethylene
TeCA	Tetrachloroethane
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USAEHA	United States Army Environmental Hygiene Agency
USEPA	United States Environmental Protection Agency
USATHAMA	United States Army Toxic and Hazardous Materials Agency
VC	Vinyl Chloride
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds

1.0 PROJECT BACKGROUND

1.1 PROJECT BACKGROUND AND WORK PLAN SCOPE

Fort Gillem dates to early 1940 when Congress appropriated funding for the construction of two installations, the Atlanta Quartermaster Depot and the Atlanta Quartermaster Motor Base. The constructions of both installations were completed in 1942. Later they merged and became known as the Atlanta General Depot. On June 28, 1974, the Site became known as Fort Gillem, a sub-installation of Fort McPherson. Since 1942, the installation had been a center for the procurement, storage, distribution, maintenance, and disposal of military equipment and supplies.

In 2005, the United States Congress approved the Base Realignment and Closure (BRAC) Commission's recommendation to close Fort Gillem by September 2011. Effective September 15, 2011, Fort Gillem, GA closed and transferred to inactive operational status in accordance with the Defense Base Closure and Realignment Act 1990, Public Law 101-510, as amended. The Garrison Commander at Fort Gordon assumed command and control of 257 acres, now designated as the Gillem Enclave. All remediation sites on the Gillem Enclave are administered by Fort Gordon. Fort Gordon Garrison Commander also assumed responsibility for 1,170 acres of the Fort Gillem excess property pending disposal (transfer). All remediation sites on the Fort Gillem excess property are administered by the BRAC Office. The Army has been working in cooperation with a local redevelopment authority, called the Forest Park/Fort Gillem Implementation Local Redevelopment Authority (ILRA), to facilitate the reuse and redevelopment of Fort Gillem.

Fort Gillem is located approximately 1.5 miles north to south in the city limits of Forest Park, Clayton County, Georgia. Residential development bounds the installation to the north. Mixed commercial and industrial development bounds the installation along Moreland Avenue to the east and Jonesboro Road to the west and southwest. A mixture of residential, commercial, and industrial development bounds the installation to the south.

In accordance with the Performance Work Statement (PWS) dated October 2013, the Army has contracted Wenck/HCR to conduct a Vapor Intrusion (VI) Study to evaluate if residential and commercial structures surrounding the installation have been impacted by the volatile organic compound (VOC)-impacted plumes related to FTG-01, FTG-07/10, and FTG-09.

The risk pathway to be evaluated by activities described in this Work Plan is the soil gas to indoor air pathway of potential exposure to off-site receptors. The study area comprises off-installation receptors, such as residential dwellings or businesses that are affected by VOC-impacted groundwater plumes, or are in close proximity to VOC-impacted areas.

The installation boundaries are shown in Figure 1. The VI study areas are depicted in Figures 2 and 3. The off-site groundwater plumes shown on the figures in this work plan were generated using the information provided in the 2008 Shaw reports. In addition, the information provided in the aforementioned Shaw

reports contributed significantly to the evaluation and identification of the work proposed in this work plan.

1.2 SUMMARY OF EXISTING SITE DATA

The prior investigations and response actions were previously summarized in the document entitled, Final Findings of Suitability for Early Transfer (FOSET), prepared by BRAC Environmental Office, dated September 2013. Because this document is current and provides a comprehensive and useful summary of investigation activities and response actions, the relevant sections concerning FTG-01, FTG-07/10, and FTG-09 are excerpted below.

1.2.1 FTG-01, North Landfill Area

FTG-01 is located in the northern portion of the installation. FTG-01 was the principal location for the disposal of surplus equipment and waste industrial material including food products, sludge from the industrial waste and sewage treatment plants, dichlorodiphenyltrichloroethane (DDT) drums, rubber products, pharmaceutical/surgical supplies and materials, petroleum, oil and lubricants (POL), XXCC-3 and gas mask parts. It comprises approximately 233.36 acres. Disposal to FTG-01 occurred from 1940 to 1980 via landfilling, trenching, burning, indiscriminate burial, and surface deposition.

Environmental investigations beginning in 1979 showed that groundwater and surface water had been impacted by material buried at FTG-01 (USAEHA, 1979; USATHAMA, 1980 and ESE, 1982). A Preliminary Assessment was completed in 1980. In 1992, an off-post well survey identified 23 private wells and one spring used as drinking water sources and six wells used for other purposes.

In 2001, an off-site investigation was conducted to determine the nature and extent of contamination migrating from Fort Gillem. The investigation focused on the area north of FTG-01 near the Western Stream. Samples collected from these areas were analyzed for VOCs, semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals.

An off-site soil vapor screening was conducted in 2003. Groundwater data collected off-site, north of the installation boundary, were used to determine the extent of the VOC plumes originating from Fort Gillem. The investigation included nine passive subsurface samplers deployed north of FTG-01 Operable Unit (OU)-A. The screening-level sampling detected VOCs including tetrachloroethene (PCE).

An off-site groundwater investigation in the residential area northwest of the OU-B NLA area was conducted in 2004 (Shaw, 2005a). The lateral extent of contamination was not completely defined but was shown to extend as far as the off-site stream west of Richard Road. The findings of the investigation concluded that VOC contamination has migrated beyond the boundary of Fort Gillem and is present at concentrations that exceed EPD HSRA target concentrations for TCE, Tetrachloroethene, and 1,1,2,2-Tetrachloroethane.

In 2008, the Georgia Environmental Protection Division (GAEPD) proposed a strategy that combined the study area and the MOU/OU approach into a watershed approach. An investigation of surface soil, subsurface soil, surface water, sediment and groundwater was performed. The primary purpose of this strategy was to integrate the off-site groundwater and surface water contamination discovered in the late 1990s. FTG-01 was subdivided into three watersheds: Western, Central and Eastern. Chlorinated VOCs –

primarily TCE, TeCA, carbon tetrachloride, and chloroform – were the contaminants of concern detected in surface water and groundwater. There are four dissolved-phase groundwater plumes, three of which have migrated off the installation.

A groundwater extraction and treatment system (GWETS) was installed and has been operating as an IRA at FTG-01 since 2009. The GWETS consists of 18 groundwater extraction wells located along the installation boundary and an aboveground treatment system. The extraction wells were designed to capture contaminated groundwater leaving the site. Contaminated groundwater is treated on site and discharged to a tributary of Conley Creek. From August 2009 through June 2011, Shaw reported 169 pounds of VOCs were removed from the groundwater by the GWETS. Since operation under the current contract with North Wind began in October 2011, over 98 additional pounds of VOCs have been removed.

GAEPD approved the Compliance Status Report Work Plan on September 11, 2013, that called for additional characterization of the off-installation contaminant plumes associated with FTG-01. The investigation is currently under way.

1.2.2 FTG-07/10, Burial Sites #1 and #4

FTG-07 is located west of Buildings 305, 307, and 308 near the southern installation boundary. It was historically known as Burial Site #1. FTG-10 is located in the southeast central part of the installation, west of Buildings 309 and 310. It was historically known as Burial Site #4. Because these sites were close to one another and did not differ significantly in terms of contaminants of concern, they were combined and are now known as FTG-07/10.

Wastes were reportedly buried in these disposal areas beginning as far back as 1948. A stream flows southward through FTG-07 and discharges into Joy Lake, a private recreational lake south of the installation boundary. A storm water outfall originates at FTG-10 and discharges into Stephens Lake.

A 1995 Environmental Site Investigation (ESI) included a geophysical survey, soil vapor survey, trench excavation, soil borings, monitoring well installation, and soil, groundwater, surface water, and sediment sampling. The primary concern in groundwater was VOC contamination that exceeded target concentrations for TCE, TeCA, PCE, and 1,1,2-trichloroethane (1,1,2-TCA).

RI activities in 1999 and 2000 included monitoring well installation, groundwater sampling, and fish sampling in Stephens Lake. The off-site investigation began in late 2000 and included surface water, sediment, and fish sampling from Joy Lake, monitoring well installation, and groundwater sampling.

An off-site soil vapor screening was conducted for areas north of FTG-01 and south of FTG-07/10 and FTG-09 in 2003. The investigation included two passive subsurface samplers deployed south of FTG-07. The soil vapor screening level sampling detected VOCs in the subsurface.

Activities to complete the RI in early 2004 included installation of an overburden bedrock monitoring well pair at the northern end of FTG-07 and collection of surface soil/surface water samples. Groundwater data indicated a broad area of FTG-07 in which TCE and PCE occurred at concentrations exceeding the United States Environmental Protection Agency (USEPA) maximum contaminant levels (MCLs). There are two dissolved-phase plumes, one of which has migrated off the installation. Soil data did not identify sources for

the VOCs that were found in groundwater. Surface water data had detections of TCE and PCE, suggesting groundwater discharge to surface water.

GAEPD approved a Work Plan on September 11, 2013, that called for additional characterization of the off-site and on-site contaminant plumes associated with FTG-07. The investigation is currently underway.

The Army conducted additional surface and subsurface soil, surface water, sediment, and groundwater sampling at FTG-07/FTG-10. The assessment included eight additional monitoring wells; two of the wells are screened in the overburden, five wells are in the partially weathered zone, and one well is in the bedrock. (See: *Groundwater Contamination at the Fort Gillem Excess Property*, dated October 2012.)

1.2.3 FTG-09, Burial Site #3

Formerly known as Burial Site #3, FTG-09 is located on the southern boundary of the installation, approximately 800 feet west of the intersection of South 3rd Street and Boundary Road. The site was used for waste disposal from 1948 to 1964. Materials known to have been buried at FTG-09 include rubber products (tires, hoses, gaskets, and aircraft wing boots), food products, several spent mortar shells, large filter canisters, and a chalky white substance known as Decontamination Agent Non-Corrosive (DNAC). DNAC contained high concentrations of 1,1,2,2-TeCA and was used for the demilitarization of a WWII Mustard Bomb.

An ESI was completed in 1995 (Foster Wheeler, 1996). One of the excavated trenches contained several drums of an unidentified white crystalline powder and a glass container. The white powder contained lead at a concentration that exceeded the RV. Substantial concentrations of chlorinated VOCs were present in soil (TeCA and TCE) and groundwater samples (PCE, TCE, 1,1-dichloroethylene [DCE], and other degradation products) from an area approximately 50 feet north of the installation boundary.

RI activities completed in 1999 included the installation of additional monitoring wells. Chlorinated VOCs, principally TCE and PCE, were detected in these wells. In 2000, an off-site investigation was initiated that defined a large plume originating at FTG-09 which migrated to the southeast. Of the domestic wells in the FTG-09 area, two wells were sampled. The plume intercepted these two domestic wells in the neighborhood south of Fort Gillem and discharged into the unnamed stream south of Fort Gillem. These wells are no longer used for potable water, and residences associated with these wells have been connected to the city water supply. Additional soil and groundwater sampling at FTG-09 provided better delineation of the source area.

A 2001 environmental investigation included a geophysical survey and installation of 24 soil borings, 17 monitoring wells, and seven trench excavations. The geophysical survey identified an area adjacent to and northeast of the plume, suggesting buried drums. A bench-scale test of potential remedial technologies, including Fenton's reagent, persulfate, and permanganate, was conducted in 2001. The results indicated that these chemical agents did not successfully treat the PCE at FTG-09.

An off-site soil vapor screening was conducted in 2003 for areas north of FTG-01 and south of FTG-07/10 and FTG-09. The investigation included seven passive subsurface samplers and one surface flux chamber sampler deployed south of FTG-09. The screening level sampling detected VOCs including PCE and TCE.

Activities to complete the RI were implemented in 2004, including the installation of additional off-site monitoring wells, collection of surface water samples, and an off-site soil gas survey over a 34-acre, off-installation area downgradient of FTG-09. Selected monitoring wells were sampled for natural attenuation parameters to evaluate monitored natural attenuation as part of the feasibility study.

The initial RI and BLRA were completed in 2008, and the draft final report was submitted to the GAEPD in 2008. GAEPD responded that additional site investigation was necessary. The scope for the Revised RI was developed in partnering meetings between the Army, U.S. Army Corps of Engineers (USACE), and GAEPD.

Two remediation systems were installed at FTG-09 as an IRA. The systems work together to treat both the source area and the VOC-contaminated groundwater. Twenty-eight (28) dual-phase extraction (DPE) wells were installed in the source area. A GWETS consisting of five wells located at the installation boundary was installed to capture contaminated groundwater leaving the site.

Contaminated soil vapor and groundwater are treated on-site. Treated water is discharged to an unnamed tributary to Upton Creek. Since October 2009 through September 2011, 1.5 tons of VOCs have been removed from the source area by the DPE system and the GWETS.

In 2010 to 2011, USACE personnel sampled off-site surface water and groundwater wells. The results of this study confirmed that surface water and groundwater contamination is migrating off the installation.

The Army submitted a Work Plan for the Revised RI and BLRA to GAEPD in August 2011. After numerous revisions, GAEPD approved the revised Work Plan on September 11, 2013. The Remedial Investigation is currently underway.

1.3 SITE-SPECIFIC DEFINITION OF PROBLEM

While no existing completed exposure pathway for VI has been documented to exist, the potential for VOC impacts to residential dwellings and certain commercial businesses near the facility boundaries exists, based on the mapped location of the VOC-impacted groundwater plumes emanating from sites FTG-01, FTG-07/10, and FTG-09.

Dwellings over portions of the plume where VOC concentrations are highest are of concern. Particular consideration will be given to areas where the distance to groundwater is very shallow (i.e., in areas near groundwater to surface water discharge features) or commercial businesses that are considered potentially sensitive receptors, such as day care facilities or facilities serving sensitive populations.

This Work Plan presents an approach to data collection to evaluate specific off-site receptors at risk of exposure through the VI pathway.

2.0 CONCEPTUAL SITE MODEL AND RISK EVALUATION

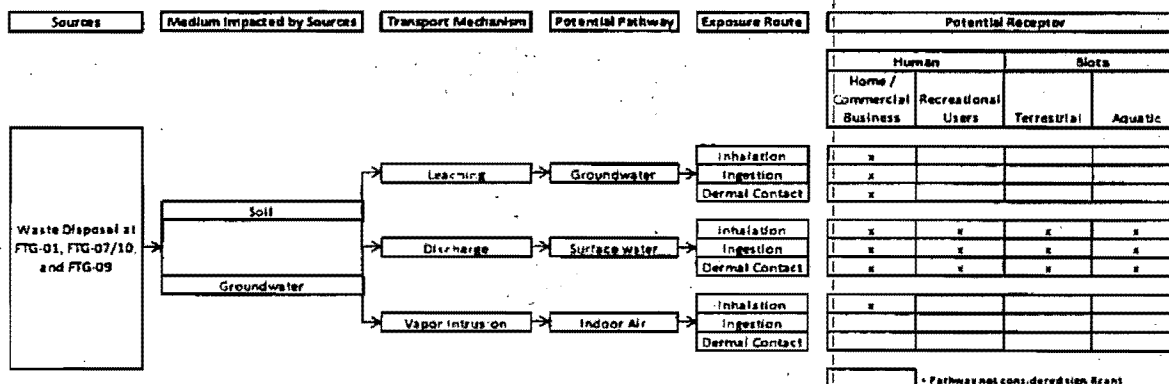
2.1 GENERAL

A Conceptual Site Model (CSM) was developed for this scope of work that provides the basis for identifying and evaluating potential contaminant sources and transport mechanisms for contaminant migration through the environment as well as evaluation of risk to receptors. The CSM includes all known sources, release and transport pathways, and potential exposure media. The components of the CSM include:

- Geology and Hydrogeology
- Contaminants of Concern
- Contamination Mechanisms
- Source Media
- Transport Mechanisms
- Exposure Media
- Exposure Pathways

Environmental conditions described by the CSM included the review of existing contaminant source, site condition, surrounding geology, and hydrologic information. This information was used to identify potential contaminant migration pathways. The CSM for the FTG-01, FTG-07/10 and FTG-09 is presented below.

Table 2-1: Conceptual Site Model Diagram



The CSM is also shown in the cross-section in Figure 4.

2.2 PHYSICAL SETTING

2.2.1 Geology

According to available geologic references and site-specific historical studies, surface geology at the site consists of unconsolidated saprolite. The saprolite varies in thickness from 0 to over 90 feet within the area. Saprolite forms as a result of the chemical and physical breakdown of the bedrock. The saprolite consists of silty and sandy clay and fine-grained silty/clayey sand (Shaw, 2008).

Bedrock geology in the area consists of the Big Cotton Indian Formation. The Big Cotton Indian Formation occurs in a large area that coincides with the Newman Tucker synform (Shaw, 2008). The Big Cotton Indian Formation consists of gneiss. Bedrock outcroppings are visible in the southern portion of Fort Gillem between FTG-07 and FTG-09.

2.2.2 Hydrogeology

According to the available references, groundwater in the area occurs in unconfined water table conditions. Unconfined groundwater levels in the areas of Fort Gillem can be as deep as 60 feet below grade. In general, groundwater flow is to the north within the northern portion of the site and to the south southeast within the southern portion of the site. Groundwater on the north and south sides of the installation discharges to surface water features including lakes, streams, tributaries, and springs.

2.2.3 Surface Water

The installation is divided by a northeast-to-southwest trending ridge. The ridge feature creates two distinct drainage basins. This creates a surface water runoff in two directions: one to the north and northwest, and the other to the south and southeast. Surface water runoff from the northern portion of the installation flows north and northwest through two perennial stream valleys. These unnamed stream valleys flow north towards and discharge into Conley Creek. Conley Creek flows in a northeasterly direction and ultimately discharges into the South River located approximately ten miles northeast of the installation.

As mentioned above, a bedrock ridge creates a topographic high between sites FTG-09 and FTG-07. Surface water flow on the south-central portion of the installation near FTG-09 is generally directed to Marchman Lake. Marchman Lake is located due west of FTG-09. Surface water discharging from Marchman Lake flows east southeast via Upton Creek. Surface water flow within the southeastern portion of the site is south toward a series of streams and lakes. Surface water flow in this general area begins in a stream that flows from FTG-10 and discharges to Stephens Lake. The outflow from Stephens Lake forms a stream that flows off of Fort Gillem property and discharges to Joy Lake. A second unnamed stream originates near the center of the FTG-07/FTG-10, flows south, and discharges to Joy Lake. The outflow from Joy Lake empties into Howell Lake, which discharges to Upton Creek.

2.3 CONTAMINANTS OF POTENTIAL CONCERN

Based on past subsurface and surface investigations, the following is a list of VOCs that are Chemicals of Potential Concern (COPC) for the off-site plumes associated with FTG-01, FTG-7/10, and FTG-09:

FTG-01:

- Benzene
- Trichloroethene (TCE)
- Tetrachloroethene (PCE)
- 1,1,2,2-TeCA
- 1,1,2-Trichloroethane (1,1,2-TCA)
- 1,1-dichloroethene (1,1-DCE)
- Carbon tetrachloride
- Chloroform
- *trans*-1,2-dichloroethene (*trans*-1,2-DCE)
- *cis*-1,2-dichloroethene (*cis*-1,2-DCE)
- Vinyl chloride
- 1, 4- Dioxane

FTG-07/10:

- Benzene
- Chloroform
- Dibromochloromethane
- TCE
- 1,1,2,2-TeCA
- 1,1,2-TCA
- 1,2-dichloroethane (1,2-DCA)
- PCE
- *trans*-1,2-DCE
- *cis*-1,2-DCE
- 1, 2,4-Trimethylbenzene
- Vinyl chloride

FTG-09:

- Chlorobenzene
- Chloroform
- *cis*-1,2-DCE
- Methylene Chloride
- PCE
- TCE
- 1,1,2-TCA
- 1,1,2,2-TeCA
- *trans*-1,2-DCE
- Vinyl chloride

Although these are the COPCs that have been identified by previous studies, samples for this study will be analyzed using the full VOC suite (TO-15 analysis for air and EPA Method 8260B for water).

2.4 CONTAMINATION MECHANISM

Historical subsurface disposal activities at FTG-01, FTG-07/10, and FTG-09 areas are the source areas for contamination to be released to groundwater through leaching. COPCs migrate via groundwater off-site and potentially affect receptors by partitioning to vadose zone soil and migrating upwards through the soil, thereby affecting potential receptors. Investigations associated with these waste disposal sites have been documented as part of numerous previous investigations (see Section 1.2).

2.5 SOURCE MEDIA

Buried waste materials have resulted in soil, groundwater, and surface water impacts within FTG-01, FTG-07/10, and FTG-09. The primary source media is the buried waste materials or historical disposal of liquids in the waste disposal areas. The secondary source media to be evaluated for potential exposure is contaminated groundwater.

2.6 TRANSPORT MECHANISMS

The following transport mechanisms were evaluated for this project:

- Leaching
- Groundwater
- Surface water
- Volatilization/Vapor Partitioning

Contaminants may migrate to the groundwater system via leaching from buried waste and impacted soil. Leaching is caused by water infiltrating through contaminated media and transporting the leached chemical into the groundwater. Based on the historical groundwater data, leaching appears to be a significant transport mechanism at the FTG-01, FTG-07/10, and FTG-09 sites.

Once leaching has mobilized COPCs to the water table, groundwater migration transports the COPCs in dissolved phase to downgradient locations. The groundwater mechanism for transport has resulted in impacts beyond the installation boundaries.

It has also been demonstrated that impacted groundwater discharges to surface water features, both on the installation and to surface water features beyond the installation boundaries. Groundwater discharges directly to lakes, directly to streams, or in some cases to surface water seeps or springs, which may be seasonal or intermittent in nature.

Contaminants in buried waste materials may migrate via volatilization if solid materials convert into a gas and become mobile. The ability for chemicals to volatilize from the buried waste materials is a function of the chemicals' volatility. This parameter is represented by Henry's law coefficient. Volatilization may be a significant transport pathway for highly volatile chemicals. In addition, dissolved-phased contaminants migrating away from the source in groundwater may migrate into the vadose zone through partitioning.

2.7 POTENTIAL EXPOSURE MEDIA

Potential exposure media describe the individual medium where contaminants are available to human receptors. Potential exposure media within this study include the following:

- Groundwater – Potential contamination from leaching as precipitation migrates through contaminated soil. This is considered a very low exposure potential because no drinking water wells are located within the FTG-01, FTG-07/10, and FTG-09 study areas. Inhalation through groundwater exposure within the previously-mentioned study areas may result from the use of private irrigation systems serviced by a private well or through groundwater migration to the surface through a natural spring. Since all groundwater in the State of Georgia is considered a possible source of drinking water, groundwater is included as an exposure route for human receptors as depicted in the Conceptual Site Model (CSM).
- Surface Water – Past investigation has determined that dissolve-phase contaminants migrating in the groundwater discharge to off-site surface water features north of FTG-01 and south of sites FTG-07/10 and FTG-09.
- Indoor Air – Numerous residential and commercial properties border the installation north of FTG-01 and south of sites FTG-07/10 and FTG-09. The majority of these properties have been developed with inhabitable buildings that are located above the FTG-01, FTG-07/10, and FTG-09 groundwater contaminant plumes.

2.8 EXPOSURE PATHWAY ANALYSIS AND RISK ASSESSMENT

The CSM for fate and transport provided the basis for identifying and evaluating the contamination mechanism, source media, transport mechanisms, and exposure media. The contaminated media (groundwater) acts as the source of contamination for transport to other potential exposure media. Dissolved contaminants found in surficial or shallow groundwater may migrate into the vadose zone and indoor air space through partitioning. The exposure pathway and associated risks to a human receptor from the potential source media related to this study is discussed below:

- Inhalation via volatilization: Indoor air exposure through vapor intrusion could occur if surficial or shallow groundwater impacts migrate beneath a building, are volatilized into subsurface soils, and then migrate upward through the vadose zone into the interior spaces of a building, contaminating indoor air. Vapor may travel through the vadose zone and into the breathing zone of a structure through the natural undisturbed soils or through preferential pathways such as utility corridors that lead to a structure, utility connections at the structure, through the drain tile system and sump, through cracks or gaps in the building foundation, etc.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The Wenck Associates, Inc. (Wenck) organizational structure for the sampling of the COPCs is shown in the organizational chart (Appendix B), which indicates the interactions between the Project Manager, Quality Assurance (QA) Manager, Field Team Leader (FTL), Site Safety and Health Officer (SSHO), and technical and support staff within Wenck as well as the interactions between HCR Construction, Inc. (HCR), Wenck, and the Army and HCR's subcontractors. This work plan provides information about overall project goals, as well as relationships and interactions between the Army, regulators, and other interested parties.

HCR and Wenck will conduct the sampling activities for the Army using an integrated team of engineering, technical, and support personnel. In addition, HCR and Wenck will oversee the performance of the following subcontractors:

- Drilling Contractor: Atlas Geo-Sampling
- Analytical Laboratory: Test America, Savannah, Georgia
- Non-Hazardous Investigation-Derived Waste (IDW) Disposal: Waste Management – Eagle Point Landfill, Ball Ground, Georgia
- Hazardous IDW Disposal: Waste Management Solutions, Emelle, Alabama
- Laboratory data validation: Diane Short Associates

3.1 RESPONSIBILITIES AND AUTHORITIES OF QUALITY CONTROL PERSONNEL

Quality Assurance Project Plan (QAPP) Worksheets 4, 7 & 8 identifies the qualifications, responsibilities, and authorities of key project personnel identified in the Project Organization Chart (QAPP Worksheets 3 & 5). The QAPP for this project is included in Appendix B.

3.2 PROJECT COORDINATION

The HCR and Wenck Project Managers will serve as the points of contact (POC) for communications with the USACE Savannah District. The HCR and Wenck Project Managers will collaboratively oversee the scheduling and reporting and conduct project meetings and briefings (including conference calls). Formal and informal periodic reviews will also be scheduled within Wenck/HCR and with the Army to evaluate status progress against plans, adjust schedules, and to coordinate resolution of outstanding issues.

3.3 SUBCONTRACTORS

Subcontractor support will be needed to complete the project. HCR will subcontract services for environmental support, drilling and well installation, laboratory chemical analysis, and waste. The HCR Project Manager and Wenck FTL will oversee and be responsible for ensuring that all subcontractors adhere to the PWS and facility regulations. The Wenck QA Manager will be the laboratory contact and will verify all data associated with the project. The Wenck Project Manager will maintain ultimate control and accountability for the project by means of formal subcontract agreements with subcontractors and through directives and

communication with the subcontractor's program and project management staff. The HCR Project Manager will have management and administrative authority for the subcontractors. The subcontractors and their support services are included in Table 3-1.

Table 3-1: List of Subcontractors

Contractor	Service
Atlas Geo-Sampling 120 Nottaway Lane Alpharetta, GA 30009 Contact: Jim Fineis jimfineis@atlas-geo.com Phone: 770.883.3372	Drilling (soil gas, groundwater monitoring well installation, sub-slab vapor point installation)
TestAmerica 5102 LaRoche Avenue Savannah, GA 31404 Contact: Michele Kersey MKersey@testamericainc.com Phone: 770.826.5460	Analytical testing laboratory
Diane Short Associates 1978 S. Garrison Street, Suite 114 Lakewood, CO 80227 Contact: Diane Short dsa7cbc@yahoo.com Phone: 303.271.9642	Laboratory data validation

3.4 TRAINING

All field personnel scheduled for work on this project have been appropriately trained in accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER) and maintain compliance with required annual training updates. Field personnel are experienced in hazardous waste site work, use of personal protective equipment (PPE), and emergency response procedures. All Wenck field personnel assigned to the project will receive the project planning documents, the Site Safety and Health Plan (SSHP), and the Accident Prevention Plan (APP) prior to beginning work on the site. The Wenck SSHP will perform work status and safety/health briefings on an as needed basis throughout the project. Relevant health and safety issues will be discussed during project safety meetings.

4.0 PROJECT SCOPE AND OBJECTIVES

4.1 GENERAL

The objective of the project is to conduct a VI Study for the off-site groundwater contaminant plumes associated with sites FTG-01, FTG-07/10, and FTG-09 in order to ensure adequate protection of public health, welfare, and the environment. The scope of services associated with the VI Study consists of the following tasks:

- Preparation of the VI Study Work Plan (this document).
- Preparation of the SSHP and APP. The SSHP was prepared in accordance with USACE Engineering Manual (EM) 385-1-1, *Safety and Health Requirements* (USACE, September 2008), to cover all field work under this delivery order. The SSHP includes emergency phone numbers and directions to the local hospital. The SSHP will also address safety and health requirements based on site-specific conditions encountered during the field activities. This document will be submitted under separate cover.
- Preparation and Implementation of the Community Involvement Plan (CIP). The objectives of the plan will be to inform the public about vapor intrusion concerns and plans to conduct additional sampling and solicit public involvement such that any necessary remedy will have public acceptance, one of the balancing criteria for remedy selection in the National Contingency Plan (NCP). The plan will include development of fact sheets, question and answer sheets, and other documents that may be needed to help educate the public and facilitate communication. Other tasks associated with the CIP will be to host community meetings and acquire signed access agreements from homeowners for purpose of collecting indoor air samples.
- Preparation of an inventory of potential receptors. The inventory of potential receptors will be used to determine buildings of interest. During the completion of this task, Wenck will develop a geographic information system (GIS) inventory of permanent improvement and known utilities located within the known boundaries of the groundwater plumes. Separate files will be created for each plume (FTG-01, FTG-09, and FTG-07/10). The inventory will identify construction type (slab, crawl space, or basement) for residential dwellings or commercial structures, ground surface elevation, heating, ventilation, and air conditioning (HVAC) type, and whether the facility is occupied or empty. The GIS inventory will also incorporate surface topography, surface water (i.e., streams, lakes, springs, etc.), well locations, and location and depths of utilities that could serve as preferential pathways.
- Installation and sampling of off-site temporary groundwater monitoring wells over the plumes associated with FTG-01, FTG-07/10, and FTG-09 (summer and winter sampling events).
- Installation and sampling of off-site soil gas probes.
- Installation of sub-slab vapor points or temporary gas probes on buildings of interest.
- Collection of sub-slab/crawl space, indoor air, and background air sampling (summer and winter sampling events).

- Preparation of Set sampling results at the conclusion of each sampling mobilization (see Project Schedule in Appendix A). GAEPD and USEPA will be provided a summary letter, data summary tables, figures, copies of all laboratory reports, chain-of-custody documents and validation forms.
- Preparation of Final Investigation Summary Reports for each site at the completion of the above-listed tasks.

A detailed discussion of the activities associated with each field activity related task is provided in Section 5.0 below.

4.2 CONTAMINANTS OF POTENTIAL CONCERN AND RISK-SCREENING CRITERIA

The list VOCs that are COPCs for the off-site plumes associated with FTG-01, FTG-07/10, and FTG-09 are listed in Section 2.3. Although these are the COPCs that have been identified by previous studies, samples for this study will be analyzed using the full VOC suite (TO-15 analysis for air and EPA Method 8260B for water). The full VOC suite is being analyzed because although there may be compounds in the home that are not associated with the plumes from Fort Gillem, there is an additive affect when evaluating VOCs within buildings. In other words, COPCs from Fort Gillem that are present in the home in addition to other VOCs attributed to activities within the building pose a risk that might otherwise not be there.

For the purpose of this study, all VOCs detected during the study will be initially screened with the most current EPA Regional Screening Levels (RSLs) for residential air to determine if any individual compounds present a risk and may warrant remedial action. Further, data will be compared to "Target Action Levels" (which will be developed by EPD/EPA/Army) to determine whether immediate action is warranted. Additionally, all data will be assessed for additive affects using the USEPA's Vapor Intrusion Screening Level (VISL) Calculator. This assessment will assume residential exposure, generic attenuation factors, a target risk of 1×10^{-6} and a hazard quotient of 1.0). This table is provided in Appendix E.

4.3 PROJECT SCHEDULE

A copy of the Project Schedule is provided in Appendix A. If scheduling changes are necessary to accommodate a change(s) in the project scope, a new project schedule will be issued to the project team.

5.0 PROPOSED FIELD ACTIVITIES

5.1 GENERAL

The following sections summarize the proposed VI Study approach, rationale, and procedures to be used during the sampling activities. Field activities will consist of: permanent and temporary well installation and groundwater sampling; installation and sampling of off-site soil gas probes; sub-slab/crawl space, indoor air, and background air sampling; and evaluation of the laboratory results of the samples collected. A proposed summary schedule of field activities is provided in Appendix A. Details of field sampling procedures are provided below.

5.2 PROPERTY / BUILDING SURVEY AND ACCESS COORDINATION

Wenck will distribute via mail educational information, Right of Entry forms, and a survey prior to performing sampling. After mailing the aforementioned items, Wenck will host an open house to give the Fort Gillem community the opportunity to ask questions, turn in right of entry forms, and get additional information about the VI Study. After the open house, door-to-door visits will be conducted to obtain right of entry forms that have not yet been returned, collect information pertaining to the property and building, and answer any questions residents/property owners may have related to the VI Study. Appendix F of the VI CIP provides script to facilitate door-to-door communication. In order to expedite the sampling process, the door to door visits will run concurrently with the sampling. As right of entry forms are received, sample dates will be scheduled, and sampling will be conducted as soon as possible. Sampling schedules will be developed taking the residents/property owners schedules into consideration. An overall summary of the pre-sampling activities is provided below:

Information that will be distributed via mail prior to door to door/field activities beginning:

- Fact Sheet #1 and Survey to property owners and residents within the area (copy provided in Appendix F)
- Letter, Fact Sheet #2, and right of entry form to Set sampling properties (copy provided in Appendix F)

During the door to door visits, Wenck/HCR will utilize USEPA's Occupied Dwelling Questionnaire to collect pertinent information related to the buildings to be surveyed. A copy of the questionnaire is provided in Appendix F. If the Occupied Dwelling Questionnaire is not filled out during the door to door survey, then it will be filled out on Day 1 of sampling. In addition, Wenck will collect the following information during the survey:

- Identify any surface water feature(s) on-site (i.e., natural springs, creeks or wetland features).
- cursory inventory of household products used in the building.

While on-site, Wenck will answer any questions the property owners/residents may have related to the Fort Gillem VI study. Additional detail related to the items discussed above is provided in the CIP.

Wenck will attempt to obtain access to properties through mailings, hosting open houses and community meetings, initial door to door visits, and visits to neighboring homes during sampling. Additionally, Wenck will encourage residents/property owners that are participating in the study to talk to their neighbors about participating. Information about the community outreach approach is provided in the VI CIP. In the unlikely event that property access is denied the Army, GAEPD, and USEPA will be notified immediately of the situation.

5.3 TEMPORARY GROUNDWATER WELL INSTALLATION AND SAMPLING ACTIVITIES

5.3.1 Utility Clearance

All proposed drilling locations will be determined prior to initiating work. The Georgia Utility Facility Protection Act (GUFPA) requires anyone who engages in excavation/subsurface activities to provide advance notice of at least 48 hours to underground utility operations affected by the subsurface work. Prior to performing the subsurface investigation, Georgia811 will be notified to identify any underground lines or structures in the vicinity of the site. Any utility lines buried at the site will be located by the appropriate utility company and indicated on the ground surface. Any private underground utility lines buried by the property owner will also need to be identified. HCR/Wenck will contract a private utility locator, if necessary.

5.3.2 Well Installation and Sampling Activities

Groundwater samples will be collected from temporary wells in an effort to better define the depth to the groundwater and VOC concentrations throughout the FTG-01, FTG-07/10, and FTG-09 groundwater contaminant plume boundaries. All temporary groundwater monitoring wells associated with this investigation will be installed in accordance with SESDGUID-101-R1, *Design and Installation of Monitoring Wells*, January 29, 2013.

In preparation for Set 1 (initial groundwater sampling) sample collection, well locations were chosen based on the following: 1) proximity of a dwelling to the installation (i.e., within approximately 100 yards) 2) existing groundwater analytical data 3) potential / known groundwater to surface water discharge areas, and 4) sensitive receptors (i.e., daycare and elderly living complexes). It is the intent that the proposed well locations will yield groundwater quality information that will assist in determining a list of Set 2 buildings of interest. Seventeen (17) temporary groundwater monitoring wells are proposed within the FTG-01, FTG-09, and FTG-07/10 study areas. The proposed monitoring well locations are shown on Figures 5 and 6. The proposed boring and well locations will be staked initially using survey equipment to ensure their proper placement and to establish surface ground elevations by leaving markers. Field staff will perform surveying of the sampling locations using near-survey grade Global Positioning System (GPS) techniques (sub-meter horizontal accuracy) and provide survey data necessary for the documentation of sample locations. The survey coordinate system used for documenting sample locations will be consistent with existing site survey data to facilitate the use of GIS capabilities for reporting purposes.

The GPS unit will be a hand-held Trimble Model GeoXT (1/2-meter accuracy) and will be used according to manufacturer's specifications. The Trimble includes data logger to store coordinates as they are collected. The datalogger files will be downloaded to appropriate GIS software to create figures. Coordinates will be included in the investigation report.

The proposed wells (shown as blue dots on Figures 5 and 6) will be advanced to the top of the shallow groundwater table. Boreholes for monitoring well construction will be advanced using push-probe drilling techniques. All equipment used in the direct-push probing operations will be steam-cleaned prior to arrival at the site. Each borehole will be advanced with a 2-inch I.D. Macro-Core[®] sampler. Each borehole will extend approximately five (5) to seven (7) feet into the top of the shallow groundwater table.

During the advancement of each soil boring, Macro-Core[®] soil samples will be collected at 4-foot intervals to the boring terminus. Soil sampling will be terminated once the shallow groundwater table is encountered. Soil classification will be performed in the field in accordance with ASTM Method D2488, *Standard Practice for Description and Identification of Soils*. A soil boring log will be created for each borehole.

The shallow temporary monitoring wells will be constructed with ten (10)-foot screens and will be installed so that the screen straddles the shallow groundwater table. The intent is to set the ten (10)-foot well screen with approximately five (5) to seven (7) feet of screen below the static water level surface. Each monitoring well will be constructed with one (1)-inch flush-threaded polyvinyl chloride (PVC) casing and PVC 10-slot (or 0.010-inch) screens.

During construction, each temporary monitoring well will be filter-packed with an appropriately-sized sand pack to no less than two (2) feet above the top of the screen. A two (2)-foot minimum hydrated bentonite pellet seal will be installed above the sand pack to protect the screen and filter pack from grout intrusion. The remaining annular space will be filled with high-solids bentonite grout. The casing will terminate approximately four to six inches below existing grade. The casing will be equipped with an expandable vented plug. The temporary wells will be protected at the surface with a four-inch steel flush-mount cover. The flush-mount cover will be fixed in place with a two to four inch concrete apron. It is anticipated that the temporary wells will be decommissioned after the completion of the second round of groundwater sampling. Prior to coordinating the abandonment of any temporary groundwater monitoring well the Army will contact GAEPD and USEPA to discuss whether groundwater water data indicates that a permanent monitoring well is necessary at those locations. After receiving approval from GAEPD abandonment of the temporary wells will be conducted in accordance with §12-5-134 of the Georgia Water Well Standards Act.

Upon completion of the installation activities each monitoring well will be surveyed using GPS technology for horizontal position, ground elevation, and in the case of the wells, top of well casing elevation. Surveying will be completed with a horizontal accuracy of +0.01 feet, and a vertical accuracy of +0.1 feet. Vertical measurements will be referenced to the National Geodetic Vertical Datum (NGVD). The GPS unit will be a hand-held Trimble[®] Model GeoXT and will be used according to manufacturer's specifications. The Trimble[®] includes a data logger to store coordinates as they are collected. The datalogger files will be downloaded to appropriate GIS software to create figures. The survey coordinate system used for documenting well locations will be consistent with existing site survey data to facilitate the use of GIS capabilities. Well coordinates will be included in the investigation summary report.

5.3.3 Groundwater Sampling Procedures

Shallow groundwater samples will be collected from each temporary well location using low-flow methods as described in the GAEPD FQBSTP for groundwater sampling (SESDFROC-301-R3). All field equipment that contacts samples to be chemically analyzed (e.g., water level meter, pumps, etc.) will be decontaminated before it is used at each sampling location. Equipment will be washed on site with clean potable water and laboratory detergent (i.e., Alconox, Liquinox or similar solution). Any local potable water supply is acceptable for decontamination purposes. For all sampling equipment cleaned on site, the waste wash water will be containerized and stored with the IDW until disposal is coordinated. IDW disposal procedures are discussed in Section 5.7 below.

Two rounds of groundwater quality sampling will be collected from each monitoring well (total of 20 temporary wells for Set 1) as part of the study. One round will be collected during the proposed Set 1 sampling event scheduled to take place between July and September 2014. The second round of sampling will be conducted during the Winter sampling event (January-March 2015).

Prior to sample collection, the well will be purged (pumping rate of less than 0.5 gallons per minute) using low-flow sampling technique. New dedicated plastic tubing will be used at each well location. During the purging process, groundwater discharge will be monitored with a water quality multi-probe situated in a low-flow cell. Groundwater field parameters including pH, specific conductance, temperature, dissolved oxygen (DO), and turbidity will be recorded periodically during the purging process to monitor well stabilization. The well will be considered stabilized when the following parameter thresholds are met:

- pH (± 0.2 Standard Units)
- Specific Conductance (± 5.0% of reading)
- Temperature (± 0.2° Celsius)
- Dissolved Oxygen (± 0.2 Standard Units)
- Turbidity (≤ 10 Nephelometric Turbidity Units [NTUs])

After the above-mentioned parameters have stabilized, laboratory samples will be collected from each well for VOC analysis (EPA Method 8260B). Quality control samples, including equipment rinsate blanks, blind field duplicates, matrix spike, matrix spike duplicate, and trip blanks will be collected per the requirements in the project QAPP (Appendix B). Samples will be labeled, recorded on chain-of-custody (COC) forms, packed on ice, and sent to TestAmerica for analysis within the required holding times.

A summary of the groundwater sampling and analytical requirements are presented in Table 5-1.

Table 5-1: Groundwater Sampling and Analytical Requirements for Set 1

Matrix	No. Field Samples	Analysis	Holding Time	Preservation Requirements	Sample Containers
Groundwater	Samples = 40 10% Blind Dups = 4 5% MS/MSD = 2 Field Blanks = 4 Trip Blanks = 6 Rinsate Blanks = 4 Total No. of samples = 60	VOCs by EPA Method 8260B	Extraction within 14 days of sample collection. Analysis within 40 days of extraction.	pH < 2, temperature <6 degrees Celsius	40 ml amber vial

Note: Matrix and Matrix Spike Duplicate samples will be collected for laboratory analyses at a 1:20 ratio.

The groundwater quality data generated during the Set 1 sampling activities will be used to assist in the evaluation process used to identify Set 2 buildings of interest. A proposed list of Set 2 building of interest will be submitted to the Army, GAEPD and USEPA for review and approval prior to installation. Set 2 wells will be installed using the same methods and procedures discussed above. Two rounds of sampling (Winter 2014/2015 and Summer 2015) will also be conducted from the Set 2 wells.

5.4 INSTALLATION AND SAMPLING OF OFF-SITE SOIL GAS PROBES

In preparation for Set 1 soil gas sample collection, locations were generally chosen based on the location of the groundwater well discussed in Section 5.2 above using the same line of reasoning. The goal of the soil gas sampling is to begin to develop a relationship between groundwater contaminant concentrations and corresponding soil gas concentrations.

In general, soil gas sample locations will correspond to the locations of the selected groundwater sample locations. For Sample Set 1, soil gas probes will be advanced at twenty-four (24) locations within the FTG-01, FTG-07/10, and FTG-09 study areas. The sample probes will be located as close to the buildings as possible to ensure appropriate sample results. The proposed soil gas sample locations are shown as orange dots on Figures 5 and 6. The proposed sample locations will be staked initially using survey equipment to ensure their proper placement and to establish surface ground elevations by leaving markers. Surveying activities will be conducted per the procedures documented in Section 5.2.2. Each soil gas sampling location will consist of a paired set of sample points. One sample point will be set near the ground surface (i.e., approximately 3 feet below grade [bg]). The second sample point will be set deeper near the surface of the groundwater plume (i.e., approximately 5 feet above the top of the shallow groundwater surface). The installation depth of the deeper sample point will be determined based on the review of the most current groundwater levels observed in the nearest overburden wells. Please note this will be an approximation. The nested pair of soil gas sample points will allow for the assessment of soil gas conditions and the attenuation with depth near the off-site properties of concern.

Boreholes used for soil gas sample point installation will be advanced using Dual Tube Soil Sampling technology. This will allow for the installation of the sample point through the outer casing after the soil core has been removed. As mentioned above, each borehole will be advanced to a depth of approximately 5 feet above the shallow groundwater surface to facilitate the installation of the soil gas implant. After

retrieving the push-probe sampling equipment and soil core, the deep polyethylene soil vapor implant connected to Nylaflow tubing via compression fittings will be lowered to within 6 inches of the bottom the borehole. After the implant is set at the desired depth, the borehole will be backfilled with a sand filter pack to within six inches of the top of the implant. After the appropriate amount of filter pack is in place, hydrated granular bentonite will be placed in the annulus in 3 inch lifts to within six inches of the bottom of the shallow implant. Six inches of filter pack will be placed in the borehole prior to installing the shallow implant. After installing the shallow implant at the desired depth, the borehole will be backfilled with filter pack to within 6 inches of the top of the second implant. A hydrated granular bentonite seal will be installed no less than one foot above the filter pack to reduce the possibility of grout intrusion. After the seal is installed, the remainder of the annulus will be backfilled to the ground surface with a high-solids bentonite grout. The implant will not be sampled for a minimum of 24 hours to allow for the subsurface to equilibrate.

After the nested implants have been allowed to sit for a minimum of 24 hours and prior to collecting soil gas samples, each implant will be leak tested. Each soil vapor implant will be fitted with brass valves for sampling purposes. The Atlas Geo-Sampling helium leak test procedures are included in Appendix C. Meteorological conditions (e.g., wind direction, precipitation information, temperature, and other site-specific information that can influence soil gas concentration patterns) will be documented at the time of sampling. Prior to collecting the sample, a minimum of three volumes (i.e., total volume of the sampling point and tube) will be purged using a graduated syringe. After the sample point has been properly purged, samples will be collected using a lab-provided summa Canister. The summa canister will be connected to the valved sample port with new piece of flexible Tygon tubing. After the summa canister is attached to the vapor point, the canister valve will be opened to initiate sample collection. Each 1 liter canister will be equipped with a 10-minute flow controller (rate equal to approximately 100 mL/min) to provide a consistent flow rate during sample collection. This will also minimize desorption of contaminants from a sorbed phase. The vacuum within the canister will be monitored to ensure an adequate sample volume is collected. Upon completion of the sampling activities each borehole will be sealed with high solids bentonite grout.

Summa canister samples will be submitted under chain-of-custody to TestAmerica for chemical analysis. Samples will be analyzed for VOCs by EPA Method TO-15.

A summary of the soil gas sampling and analytical requirements are presented in Table 5-2.

Table 5-2: Soil Gas Sampling and Analytical Requirements for Set 1

Matrix	No. Field Samples	Analysis	Holding Time	Preservation Requirements	Sample Containers
Soil Gas	Samples = 48 10% Blind Dups = 5 Total No. of samples = 53	EPA Method TO-15	28 days	Ambient temperature	6 liter stainless steel summa canister

Note: Matrix and Matrix Spike Duplicate samples will be collected for laboratory analyses at a 1:20 ratio.

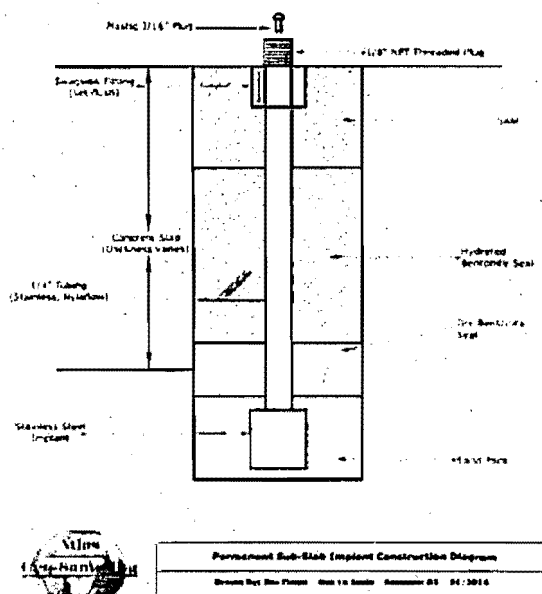
The soil gas analytical data generated during the Set 1 sampling activities will be used to assist in the compilation of the Set 2 buildings of interest. Set 2 sampling locations will be submitted to the Army, GAEPD and USEPA for review and approval prior to implementing the field work. Set 2 soil gas sampling will be performed using the same methods and procedures discussed above.

5.5 SUB-SLAB, INDOOR AIR, AND BACKGROUND AIR SAMPLING

During Set 1 sampling activities, sub-slab soil gas/crawl space and indoor air sampling will be conducted at a number of locations shown on Figures 5 and 6 to evaluate the VI potential off-site and over the historic groundwater contamination plumes. Buildings in close proximity (i.e., within approximately 100 yards) to the installation boundary and over the plumes will be sampled as soon as possible, not pending groundwater sampling or soil gas sampling. In addition, any highly sensitive receptors (i.e., daycares, elderly living communities) or residences near springs (i.e., shallow groundwater) will also be evaluated during Set 1 sampling activities. Based on the review of available information, Wenck has identified 92 potential properties that will be evaluated during Set 1 of the investigation. As mentioned above the groundwater and soil gas information obtained during the sampling of the Set 1 buildings of interest will be used to assist in the determination of the Set 2 buildings of interest that will undergo indoor air sampling and evaluation.

Sampling activities will include the following procedures:

- Obtain approval of the property owner to collect the appropriate air quality samples (See Section 5.2 Property/Building Survey and Access Coordination).
- If building is on a slab or has a basement, install two¹ permanent sub-slab implants in the floors of the buildings where access has been granted (sub-slab implants will need to cure overnight). Implants will be placed in a central location. Implants will be installed per the diagram shown below:



¹ For most properties, only two sub-slab implants are needed. However, in larger buildings such as the day care facility in sample set 1, the number of sub-slab implants is dependent upon the size and layout of the building and will be decided in the field.

between 100 to 200 mL/min. TO-15 samples will be collected using the same procedures used to collect indoor air samples. Samples will be collected semi-annually (summer and winter).

- If the building to be evaluated is not a slab-on-grade structure, then Wenck will attempt to collect air samples from within the crawl space. One 24-hour TO-15 summa canister sample will be collected within the crawl space. Samples will be collected using the same procedures used to collect indoor air samples. Samples will be collected semi-annually (summer and winter).
- If the property owner does not approve the installation of the permanent implant and denies access to the crawl space, Wenck will attempt to gain approval to collect soil gas samples from beneath the structure. Two soil gas sample points will be installed at an angle from the exterior of the house extending beneath the structure. Soil gas sample points will be installed per the procedures discussed in Section 5.3 above. TO-15 samples will be collected using the same procedures used to collect indoor air samples. Samples will be collected semi-annually (summer and winter).
- Collect one 24-hour TO-15 6L summa canister sample of indoor air. The summa canister will be centrally located in the building. If property owners have problems with 24-hour samples, GAEPD should be notified and permission to sample for less time shall be requested. At the time of sample collection, the summa canister sample port will be placed in the breathing zone, approximately three to five feet from the floor. The sample will be collected from the center of the room if possible. Ideally, samples will be collected from the lowest level of the structure (e.g., first floor or basement if applicable) near the suspected source to assess worst-case exposures and the distribution of contaminants within the structure. The sample will be collected by placing a summa canister in the appropriate sampling location (in the breathing zone as mentioned above). A flow controller will be affixed to the canister prior to sampling. The flow controller will be pre-set by the laboratory to collect the sample over a 24-hour period. An in-line moisture trap will be installed to prevent moisture from entering the canister. After the flow controller and moisture trap have been placed on the canister, the valve on the canister will be opened to begin sample collection. Indoor air sampling will begin several minutes prior to beginning the sub-slab or crawl space sampling. After approximately 24 hours have passed, the valve on the canister will be closed. The sampler will then record the time in the field logbook and on the COC. The sample will then be sent under COC to TestAmerica for testing.
- Background air sampling will occur in proximity to structure samples but are not required at every sample location. Background samples will be taken to represent ambient air conditions. Per USEPA's recommendation, background air sampling will be conducted at a rate of one sample per five structures evaluated. Background TO-15 samples will be collected using the same procedures used to collect indoor air samples. 24-hour samples will be taken using a 6L summa canister. Background air sampling will begin approximately one hour before any indoor air sampling is to commence. Background sample locations will be surveyed per the procedures documented in Section 5.2.2 above.
- During each sampling event, Wenck will collect and document meteorological information relative to the sampling event including wind speed and direction, temperature, atmospheric pressure, and rainfall measurements.
- All samples shall be collected contemporaneously (to the greatest extent possible) and delivered to a certified laboratory and analyzed for VOCs by EPA Method TO-15.

In an effort to prevent vandalism of Summa canisters in the field during sampling, canisters collecting background samples will be chained and locked to fences or posts and hidden from view, where possible.

Summa canisters will also be labeled with instructions not to tamper with them and to call the VI-Hotline number to report concerns or questions. The information collected during Set 1 sampling activities (i.e., groundwater, soil gas, and indoor air quality) as well as information collected during sampling of shallow groundwater monitoring wells and soil gas probes located near Set 2 buildings of interest will be used to assist in the determination of the Set 2 buildings of interest. Additionally, data generated during more recent groundwater and surface water studies will also be evaluated to assist in the determination of Set 2 buildings of interest. Set 2 sampling locations will be submitted to GAEPD and USEPA for review and approval prior to installation. Set 2 buildings of interest will be sampled using the same methods and procedures discussed above. Two rounds of sampling (summer and winter) will also be conducted from the Set 2 buildings of interest. Below is an outline of sampling activities for each day:

First Sampling Round:

Day 1: Mobilization to site, identification of location for sub-slab sampling ports, and port installation. Temporary flush-mount sub-slab sampling ports will be installed in the homes so that the same ports can be used for the second round of sampling. Any questions that the resident/property owner has about the sampling process will be answered. Education on VOCs and the use of household products containing VOCs during the sampling will be given. If the Occupied Dwelling Questionnaire has not been filled out, it will be filled out.

Day 2: Summa Canister set-up for background, indoor air, and sub-slab sampling. Background sample collection will begin one hour before indoor air sampling. Indoor air sampling will begin prior to sub-slab/crawl space sampling.

Day 3: Summa Canisters (for indoor air and background samples) will be turned off after 24 hours and collected from property.

Note: If the home has a crawl space, then the first sampling round will be condensed to two days since sub-slab sampling ports will not need to be installed.

Second Sampling Round:

Day 1: Summa Canister set-up for background, indoor air, and sub-slab sampling. Background sample collection will begin one hour before indoor air sampling. Indoor air sampling will begin prior to sub-slab/crawl space sampling.

Day 2: Summa Canisters will be turned off after 24 hours and collected from property.

A summary of the air sampling and analytical requirements are presented in Table 5-3.

Table 5-3: Air Sampling and Analytical Requirements for Set 1

Matrix	No. Field Samples	Analysis	Holding Time	Preservation Requirements	Sample Containers
Air	Sub-slab or Crawl Space samples = 368 (2 per dwelling x two sampling events) Note: Total number assumes that either sub-slab [2] or crawl space [1] samples will be collected at each dwelling. For the purpose of providing a total number of samples it is assumed that 2 samples will be collected at every location. Indoor Samples = 184 (one per dwelling x two sampling events) Background Samples (1 per approx. 5 dwellings sampled) = 40 (20 summer and 20 winter) 10% Blind Dups = 60 Total No. of samples = 652	EPA Method TO-15	28 days	Ambient temperature	6 liter stainless steel summa canister

Notes: Total number of samples assumes access to all 92 properties identified within the VI study areas.

5.6 EVALUATION OF INVESTIGATION DATA AND IDENTIFICATION OF SET 2 BUILDINGS OF INTEREST

As discussed in the previous sections there will be two sampling sets (Set 1 and Set 2) in this investigation. Sample Set 1 will be buildings in close proximity (within approximately 100 yards) to the installation boundary and over a plume associated with FTG-01, FTG-07/10, and FTG-09. Properties overlying the plumes with sensitive receptors and other houses of interest such as those near springs and contaminated surface water have been selected as part of Set 1.

Upon receipt of the laboratory data generated during the Set sampling activities Wenck will evaluate the data by performing a cursory screening against USEPA RSLs. Below presents a decision flow chart based on the initial data evaluation:

- Wenck will review and perform a cursory screening against the USEPA residential air RSLs the data it within 7 days of receipt,
- If the data do not reveal any RSL exceedances the data package will be validated. The summarized results (letter format) will be presented to the property owner within 10 days of validation.
- If the data reveals any compound above its applicable RSL the data will be presented to the GAEPD and USEPA within 14 days of Wenck's evaluation of the data. Data will be validated immediately in an effort to deliver the results to the property owner as expeditiously as possible.
- If the data reveals any individual compound in excess of 10x its applicable RSL the data will be submitted to the GAEPD and USEPA with three days of Wenck's evaluation of the data. Data will be validated immediately in an effort to deliver the results to the property owner as expeditiously as possible.
- If the data reveals an "Action Level" exceedance (Action Levels are currently being evaluated and will be provided under separate cover to GAEPD and USEPA for review prior to initiating Set 1 sampling efforts), GAEPD and USEPA will be notified immediately. This scenario will initiate the Mitigate Plan (to be provided under separate cover for GAEPD and USEPA review and approval).

Upon completion of the Set 1 VI Study field activities, Wenck will compile the environmental data generated during the Set 1 sampling activities, past, current and future site data (i.e., groundwater and surface water data), and structural data in a conceptual site model to evaluate additional buildings for potential VI concerns. These buildings will be part of Set 2 sampling. Set 2 buildings of interest will be identified for targeted sampling using the available data and USEPA screening protocols. Set 2 sampling will be conducted using the same procedures used during Set 1 sampling. The goal of the Set sampling program is to build defensible evidence for selecting buildings of interest for further evaluation.

In summary, this evaluation process will 1) determine the potential risk to the properties sampled in Set 1 of this investigation and 2) identify other properties (Set 2) that will require VI evaluation.

Upon GAEPD, USEPA and Army approval of the list of properties presented in a VI Summary Report, Wenck/HCR will conduct Set 2 sampling activities for these properties using the procedures outlined in Section 5.4. Per the negotiated proposal, Wenck has been authorized by USACE to conduct sampling at up to 150 buildings of interest.

The results of this evaluation (Set 1 and 2) will be presented in three separate VI Reports, one for each site associated with this study. Section 7.0 outlines information that will be included in these reports.

5.7 INVESTIGATION DERIVED WASTE MANAGEMENT

IDW generated during the investigation activities (e.g., PPE including Tyvek® and nitrile gloves, tubing, sample packaging material, etc.) will be placed in plastic bags for temporary storage. Other IDW (e.g., well purge water, decontamination rinsate) will be containerized in a drum. All IDW will be temporarily stored in a secure location on Fort Gillem property until proper disposal is coordinated. At the completion of all the investigation activities discussed above, the IDW will be properly characterized in accordance with §262.11 of the Georgia Rules for Hazardous Waste Management. After proper characterization, the waste will be transported to the appropriate landfill for disposal.

6.0 DOCUMENTATION PROCEDURES

6.1 FIELD LOGBOOK

Field logbooks will be hardbound with supplemental, water-resistant log sheets. Entries in the logbooks and supplemental log sheets will be written using indelible ink. The top of each page will include the project name and number, date, and page number. The bottom of each page in the book will include the time, initials of the person recording the entries, and sufficient detail so that the logic used in decision-making during the project can be tracked through later review. During each day of project activity, information will be recorded in each field logbook including, but not limited to:

- Project Name
- Date/time
- Name and title of any personnel or Army representatives on site
- Purpose of the field activity
- Location of project activities
- Planned chronology of events during the day
- Information concerning any property access arrangements
- Information about any conversations with property owners or members of the public
- Weather conditions, air temperature, wind speed, and direction
- General field observations
- Date and time of sample collection
- Notes related to QC samples (i.e., blind duplicate, Matrix Spike [MS], Matrix Spike Duplicate [MSD] associates)
- Sample Identification (ID) number(s) and location information
- Sample transportation information, including the name of the laboratory and courier (if applicable)
- Information on any deviations from the approved work plans, including methodology and sample collection
- Summary of daily tasks and documentation on any scope of work changes required by field conditions
- Printed name, signature, and date on the bottom of each logbook page

6.1.1 Photographic Records

Digital photography will be conducted during implementation of the proposed field activities. Digital photography will be numbered and cataloged in the field notebook to include a description of the scene, site area, date, and time. Selected digital photographs will be incorporated in the VI Study summary documentation. A photographic log will be maintained in the field notebook to identify the location and subject of each photograph. The photographer will review the photographs and compare them to the photographic log to confirm the log and photographs match on a daily basis.

6.2 SAMPLE DOCUMENTATION

6.2.1 Sample Labels and/or Tags

Labels will be affixed to all sample containers during sampling activities. Information will be recorded on each sample container label at the time of sample collection. The information to be recorded on the sample container labels will be as follows:

- A unique sample number with consistent format (see below)
- Sample matrix
- Date
- Time
- Parameters to be analyzed
- Preservative (if any)
- Site ID
- Sampler's initials

Labels will be secured to the bottle and will be completed in indelible ink. The field sample numbering system will be as follows:

Groundwater Sample Labels:

The field sample numbering system for groundwater samples will be as follows:

GWMMDDYYNN

Where:

GW = Groundwater Sample (e.g. 01 is water sample 1)
MM = Month number for sample collection date (e.g. May is "05")
DD = Date number for sample collection date (e.g. 2nd is "02")
YY = Year number for sample collection date (e.g. 2014 is "14")
NN = Consecutive sample numbers (01, 02, 03, etc.)

Trip blanks, equipment rinsate blanks, and field duplicates use consecutive sample numbers (NN) just like any other environmental sample. Samples that are collected as field duplicates will be collected, numbered, packaged, and sealed in the same manner as other samples and submitted "blind" to the laboratory.

Soil Gas Sample Labels:

The field sample numbering system for soil gas samples will be as follows:

SGMMDDYYNN

Where:

SG = Soil Gas Sample (e.g. 01 is water sample 1)
MM = Month number for sample collection date (e.g. May is "05")
DD = Date number for sample collection date (e.g. 2nd is "02")
YY = Year number for sample collection date (e.g. 2014 is "14")
NN = consecutive sample numbers (01, 02, 03, etc.)

Field duplicate samples use consecutive sample numbers (NN) just like any other environmental sample. Samples that are collected as field duplicates will be collected, numbered, packaged, and sealed in the same manner as other samples and submitted "blind" to the laboratory.

Indoor Air Sample Labels:

The field sample numbering system for indoor air/sub-slab or crawl space samples will be as follows:

IAMMDDYYNN or SBSLMMDDYYNN or CSMDDYYNN

Where:

IA = Indoor Air Sample or
SBSL = Sub-Slab Air Sample or
CS = Crawl Space Air Sample
MM = Month number for sample collection date (e.g. May is "05")
DD = Date number for sample collection date (e.g. 2nd is "02")
YY = Year number for sample collection date (e.g. 2014 is "14")
NN = consecutive sample numbers (01, 02, 03, etc.)

Field duplicate samples use consecutive sample numbers (NN) just like any other environmental sample. Samples that are collected as field duplicates will be collected, numbered, packaged, and sealed in the same manner as other samples and submitted "blind" to the laboratory.

6.2.2 Chain-of-Custody Records

Field personnel are responsible for sample custody from the time of collection until the time of sample shipment. Samples must be kept in the secure possession of the sampler, meaning that they are either within sight of the sampler, in the sampler's secure vehicle, or within the secure office of the sampling firm. The COC procedures implemented for the project will provide documentation of the handling of each sample from the time of collection until completion of laboratory analysis. The COC form serves as a legal record of possession of the sample. A sample is considered to be "in custody" if one or more of the following criteria is met:

- The sample is in the sampler's possession.
- The sample is in the sampler's view after being in possession.

- The sample was in the sampler's possession and then was placed into a locked area to prevent tampering.
- The sample is in a designated secure area.

Custody will be documented throughout the project field sampling activities by the COC form initiated for each day during which samples are collected. This record will accompany the samples from the site to the laboratory and will be returned to the Wenck Project Manager with the final analytical report. All personnel with sample custody responsibilities will be required to sign, date, and note the time on the COC form when relinquishing samples from their immediate custody (except in the case where samples are placed into designated secure areas for temporary storage prior to shipment). Bills of lading or air-bills will be used as custody documentation during times when the samples are being shipped from the site to the laboratory, and they will be retained as part of the permanent sample custody documentation.

COC forms will be used to document the integrity of all samples collected. To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, COC forms will be filled out for sample sets as determined appropriate during the course of fieldwork. An example of the COC form to be used for the project is included in the project QAPP (Appendix B).

The following procedures for chain-of-custody forms will be followed:

- COC forms to be used will be TestAmerica standard forms (see attached example).
- COC forms will include the project name or number, signature of sampler, receiving laboratory, sample ID numbers, date and time of collection, sample location, number of containers, analyses requested, sample matrix, and custody transfer signatures, including the name of the shipping company. Signature of personnel from the shipping company is not required. The shipping bill number will be recorded on the COC form.
- One COC form will be supplied in each cooler.
- COC forms will be completed in ink.
- Mistakes will be lined out with a single line and initialed and dated.
- Entries will be sequentially numbered.
- Repetitive entries made in the same column may be simplified with a continuous vertical arrow between the first entry and the next different entry. A "ditto" or quotation marks indicating repetitive information will not be used.
- Multiple COC forms for a single shipment will be consecutively numbered using the "Page ____ of ____" designation.
- At least one copy of the COC form will be filed with the sampling firm for tracking and laboratory communication purposes.

The individual responsible for shipping the samples from the field to the laboratory will be responsible for completing the COC form and noting the date and time of shipment. This individual will also inspect the form for completeness and accuracy. In addition, this individual is responsible for determining the shipping classification for samples under United States Department of Transportation (USDOT) HM126F. After the form has been inspected and determined to be complete, the responsible individual will sign, date, and note the time of transfer on the form. For commercial couriers, the COC form will be placed in a sealable plastic bag and placed inside the cooler used for sample transport after the field copy of the form has been

detached. In this case, the laboratory will retain a copy of the shipping bill as proof of custody during transit. For laboratory couriers, the COC form will be placed in a sealable plastic bag on the top of the cooler for the courier to accept custody. The field copy of the form will be appropriately filed and kept at the site for the duration of the site activities.

In addition to the COC form, COC seals will also be placed on each cooler used for sample transport. These seals will consist of a tamper proof adhesive material placed across the lid and body of the coolers in such a manner that if the cooler is opened, the seals will be broken. The COC seals will be used to ensure that no sample tampering occurs between the time the samples are placed into the coolers and the time the coolers are opened for analysis at the laboratory. Cooler custody seals will be signed and dated by the individual responsible for completing the COC form contained within the cooler.

6.3 DOCUMENTATION PROCEDURES/DATA MANAGEMENT AND RETENTION

Field documentation from logbooks, data collection sheets, digital photography email correspondence, and COC forms will comprise the bulk of the field documentation associated with the sampling and remediation at the site. Hardcopy field data will be reproduced for backup and scanned for inclusion in the project.

The Wenck QA Manager is charged with tracking the reporting of analytical data and sample coordinates and tracks the external analytical data validation performed by Diane Short Associates. The Wenck QA Manager will also track and manage the updating and storage of all analytical data tables (Microsoft Excel) generated during the preparation of the VI Study summary reports.

Digital data files will be stored on a network drive at Wenck's Maple Plain, Minnesota office. This network drive is backed up nightly, with additional backup tapes from other increasing time intervals also being concurrently stored at any given time, which minimizes the potential of losing the most current versions of these databases. Data stored electronically by Wenck will be retrievable.

7.0 REPORTING

7.1 INTERIM REPORTING

Set sample results will be provided at the conclusion of each sampling mobilization (see Project Schedule in Appendix A). GAEPD and USEPA will be provided a summary letter, data summary tables, figures, copies of all laboratory reports, chain-of-custody documents and validation forms.

7.2 VI INVESTIGATION SUMMARY REPORT

Upon completion of proposed VI Study activities, a separate report for each site (FTG-01, FTG-07/10, FTG-09) summarizing the field investigation activities and analytical results will be submitted in accordance with the document distribution list outlined in the PWS, dated October 2013 (Table 7-1). The summary report will include the following:

1. Discussion of all field activities including well installation, groundwater sampling, soils gas sampling and indoor air sampling procedures.
2. All data and analyses from the field investigation including groundwater quality summary tables, groundwater plume maps, IDW characterization results, soil gas data results, indoor air data results, and a discussion of any changes/deviations from the approved work plan.
3. Conclusions and Recommendations for additional investigation and / or corrective action (if needed).
4. Copies of all laboratory reports, COC documentation, and laboratory data validation reports.
5. Waste disposal records associated with the disposal of the IDW.

Table 7-1: Document Distribution List

OVERNIGHT MAILING ADDRESS	COPIES OF REPORTS		
	DRAFT	DRAFT FINAL	FINAL
U. S. Army Corps of Engineers ATTN: CESAS-PM-H Ms. Tracey Epperley, PM 100 W. Oglethorpe Avenue Savannah, GA 31401	2	2	2
	Electronic	Electronic	Hard Copies w/ CD
Department of the Army BRAC Environmental Office Attn: BRAC Environmental Coordinator 1386 Troop Row SW Fort McPherson, GA 30330-1069	1	1	3
	Electronic	Electronic	Hard Copies w/CDs
U.S. Environmental Protection Agency, Region IV Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW	0	2	2
		Electronic	Electronic

June 2014
W912HN-13-D-0016, Task Order: 0003

FINAL Vapor Intrusion Study Work Plan
Fort Gillem, Sites FTG-01, FTG-07/10, FTG-09

Atlanta, GA 30303			
Georgia Department of Natural Resources Environmental Protection Branch Martin Luther King JR, Drive Suite 1054 East Tower Atlanta, GA 30334	0	3	3
		Hard Copies w/CD	Hard Copies w/CD
TOTAL	3	6	8

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June 2014

W912HN-13-D-0016, Task Order: 0003

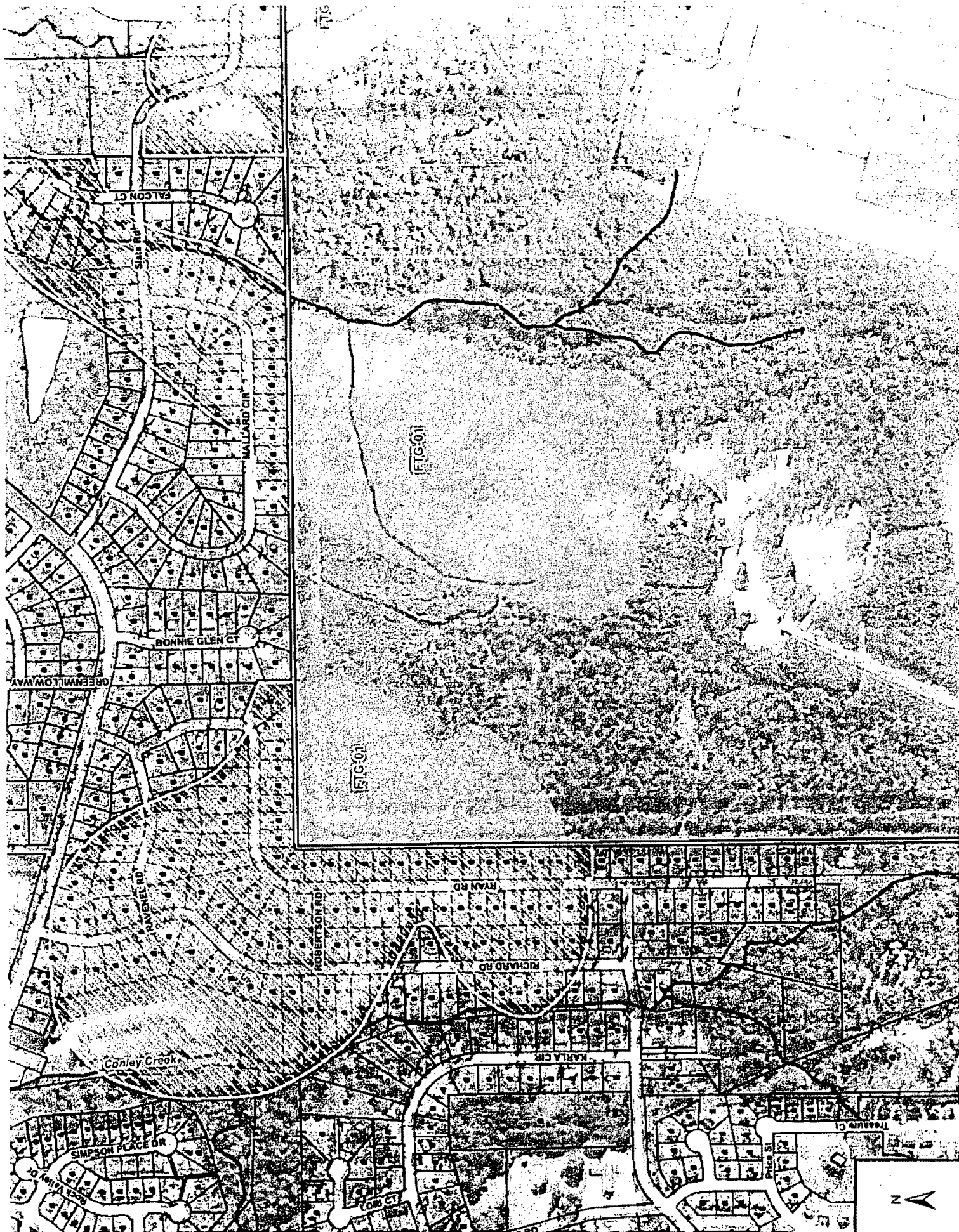
FINAL Vapor Intrusion Study Work Plan
Fort Gillem, Sites FTG-01, FTG-07/10, FTG-09

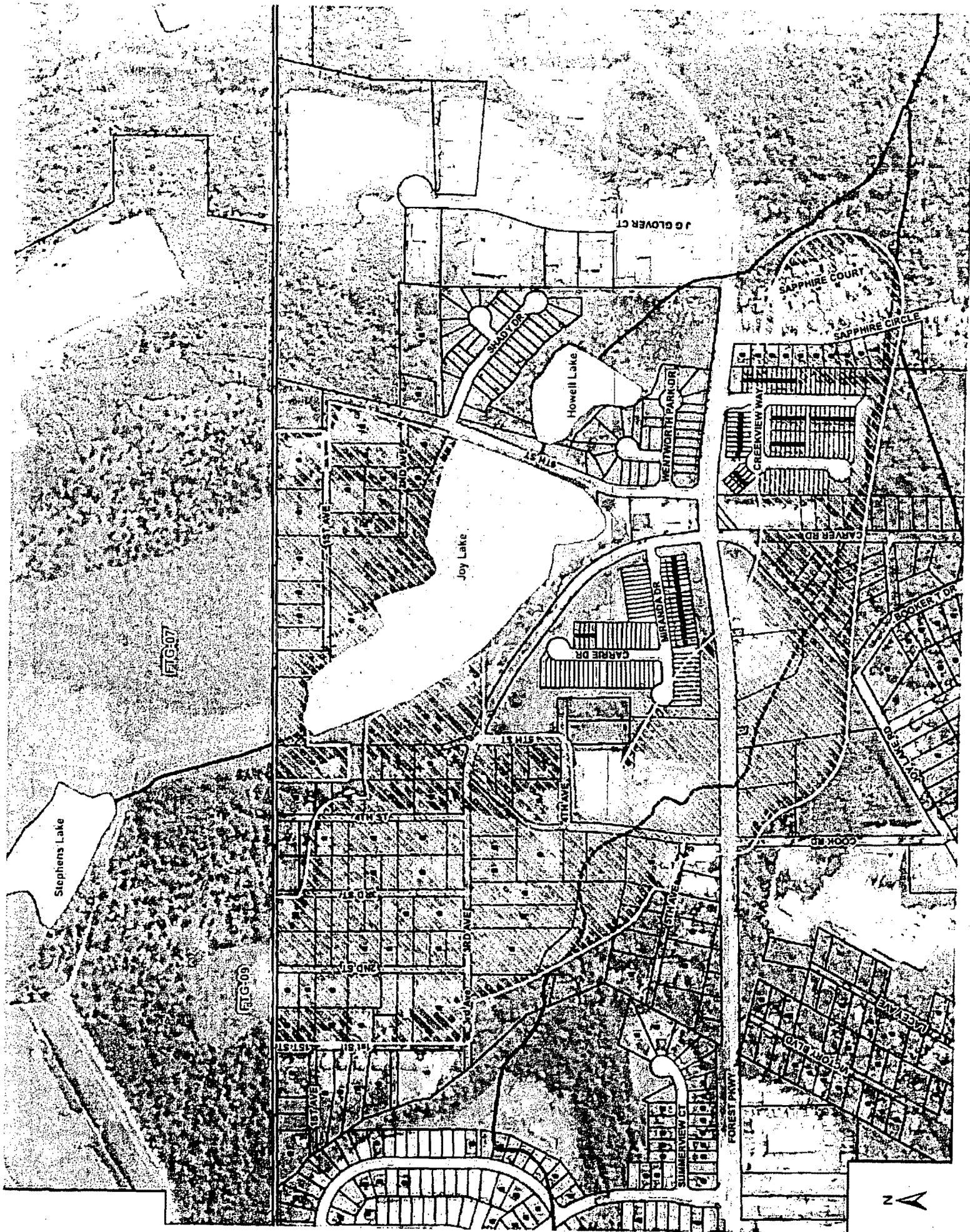
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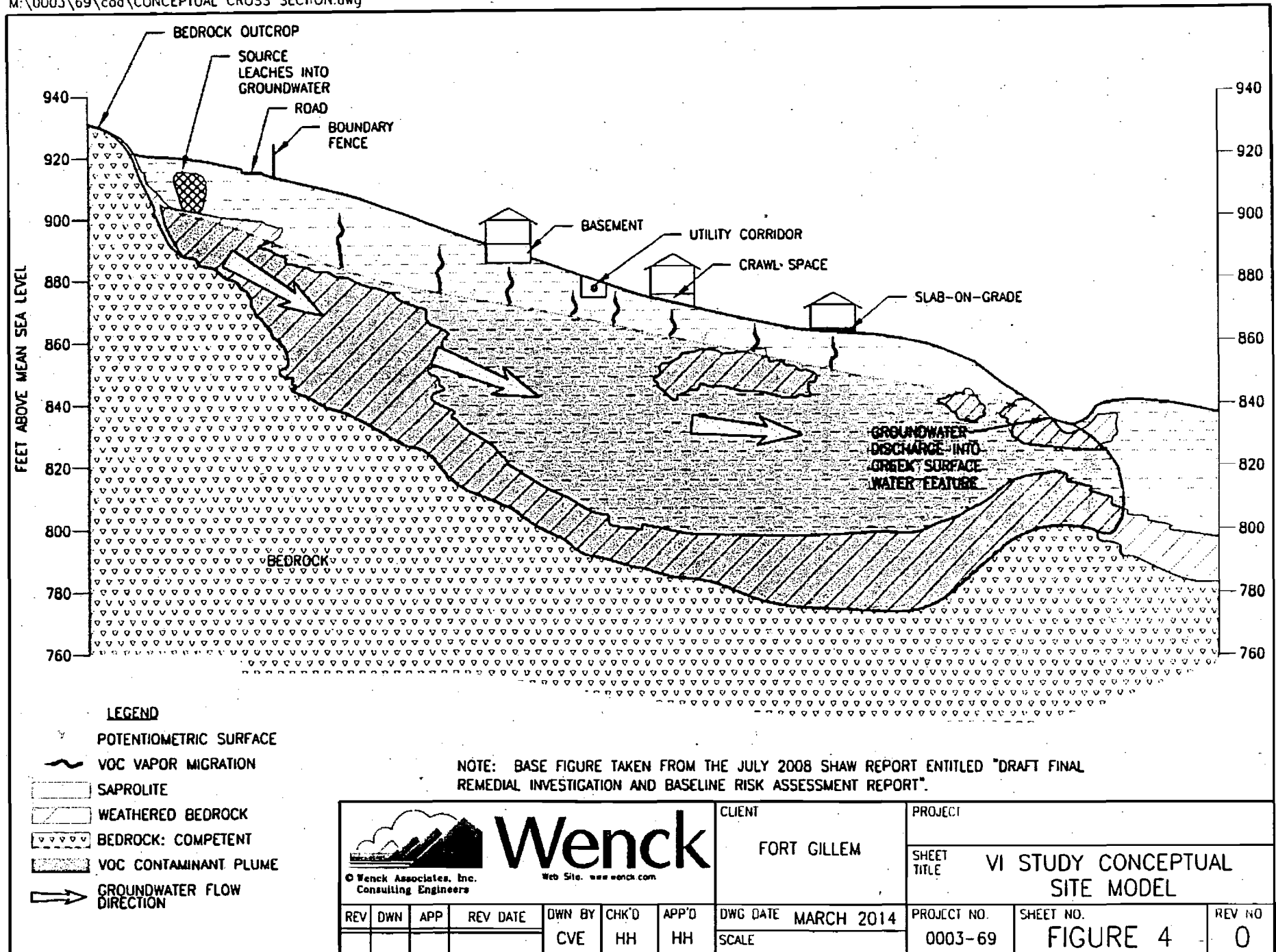
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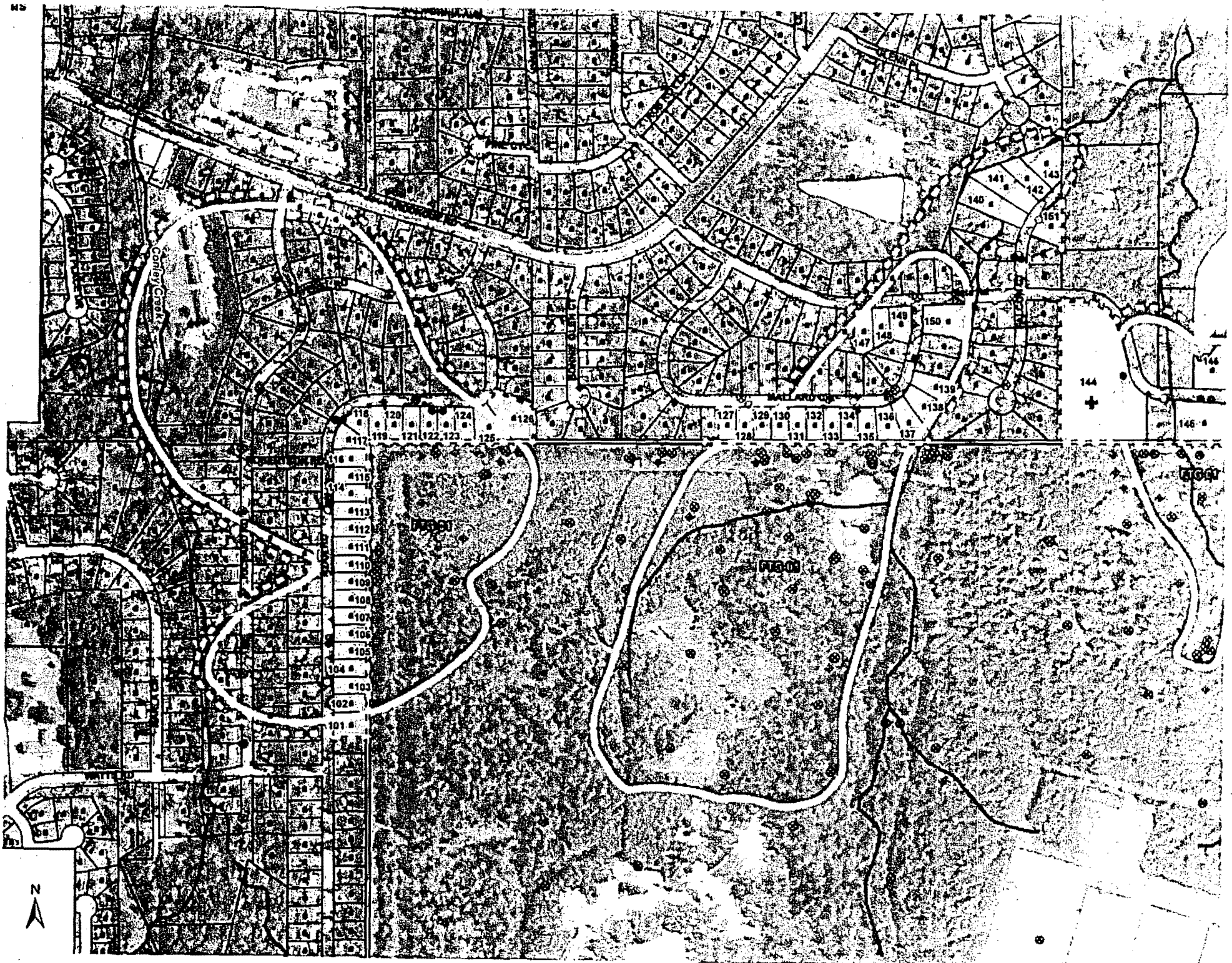
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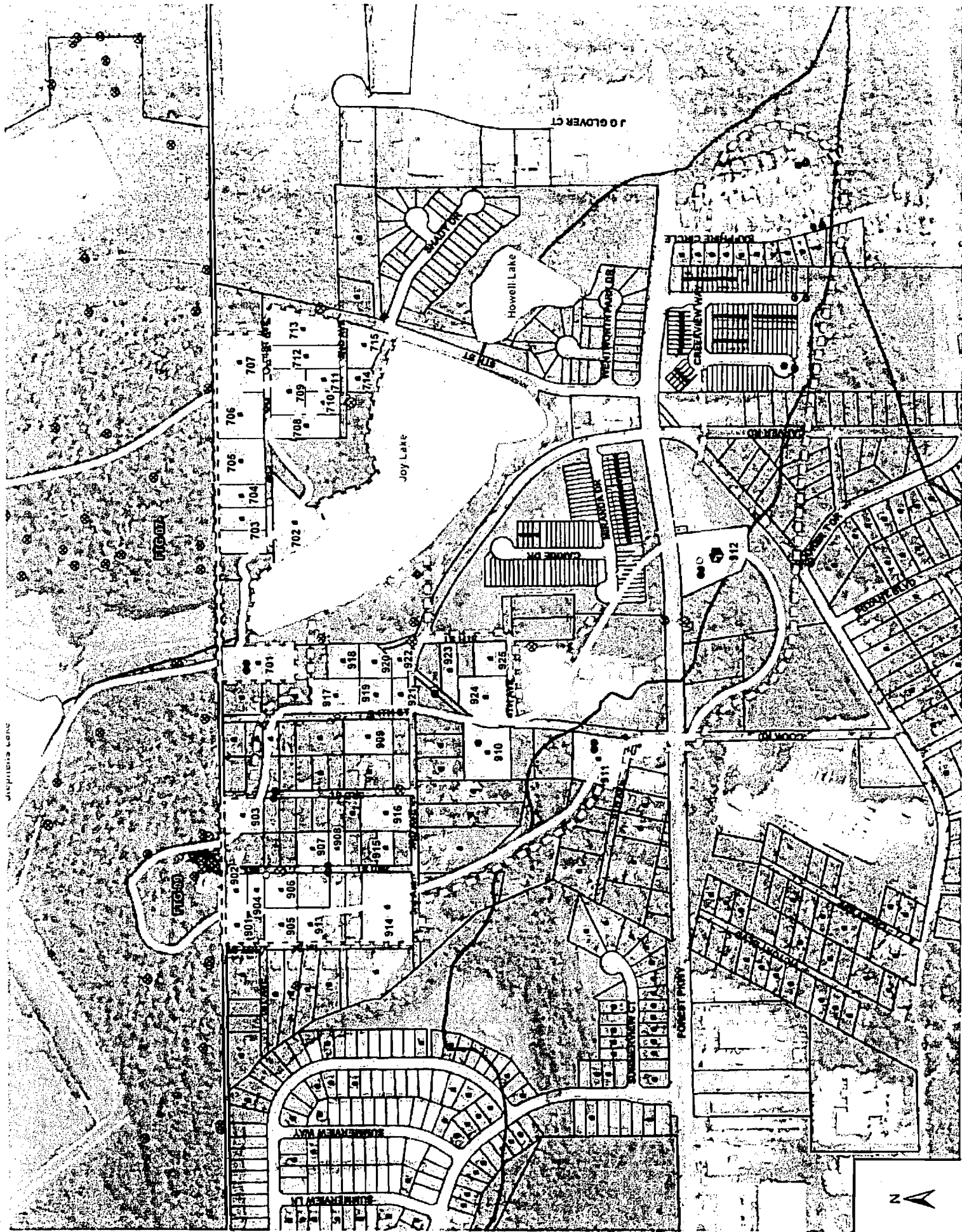
Figures











Appendix A

Project Schedule

Fort Gillem Vapor Intrusion Study			
Task Name	Duration*	Start	Finish
Vapor Intrusion Work Plan (Work Plan)			
Draft Work Plan Submittal	0 days	Sun 3/2/14	Sun 3/2/14
Army Review of Draft Work Plan	15 edays	Sun 3/2/14	Mon 3/17/14
Response to comments	14 days	Mon 3/17/14	Thu 4/3/14
Draft Final Work Plan Submittal	0 edays	Thu 4/3/14	Thu 4/3/14
GA EPD/EPA Review	30 edays	Thu 4/3/14	Sat 5/3/14
Response to Comments	15 days	Mon 5/5/14	Thu 5/22/14
Final Work Plan Submittal	0 edays	Fri 5/23/14	Fri 5/23/14
Revised Final Work Plan Submittal	0 edays	Mon 6/23/14	Mon 6/23/14
Work Plan Approval	TBD	Before 7/8/14	Before 7/8/14
Response Action Technical Memorandum Submittal	0 edays	Mon 6/23/14	Mon 6/23/14
Response Action Technical Memorandum Approval	TBD	Before 7/8/14	Before 7/8/14
Site Safety and Health Plan and Accident Prevention Plan (SSH/APP)			
SSH/APP Plan Development	45 edays	Thu 1/16/14	Sun 3/2/14
Draft Work SSH/APP Submittal	0 edays	Sun 3/2/14	Sun 3/2/14
USACE Review	15 edays	Sun 3/2/14	Mon 3/17/14
Response to Comments	14 days	Mon 3/17/14	Thu 4/3/14
Submittal of Final SSH/APP Plan	0 edays	Mon 6/30/14	Mon 6/30/14
SSH/APP Plan Approval	5 edays	Fri 7/4/14	Fri 7/4/14
Community Involvement Plan (CIP)			
Community Involvement Plan Development	45 edays	Fri 1/31/14	Mon 3/17/14
Submittal of Draft Community Involvement Plan	0 edays	Mon 3/17/14	Mon 3/17/14
Army Review of Draft Community Involvement Plan	15 edays	Mon 3/17/14	Tue 4/1/14
Response to Comments	14 days	Tue 4/1/14	Fri 4/18/14
Submittal of Draft Final Community Involvement Plan	0 edays	Fri 4/18/14	Fri 4/18/14
GA EPD/EPA Review	30 edays	Fri 4/18/14	Sun 5/18/14
Submittal of Final Community Involvement Plan	0 edays	Tues 7/1/14	Tues 7/1/14
Community Involvement Plan Approval	TBD	Before 7/8/14	Before 7/8/14
Community Involvement Plan Implementation			
Set up of hotline number, listserv, facebook page, etc	12 days	Mon 5/26/14	Wed 6/11/14
Press Release	1 day	Wed 6/25/14	Wed 6/25/14
Fact Sheet #1- Distribution	8 edays	Tues 6/17/14	Tue 6/24/14
Fact Sheet #2 - Distribution of letters and fact sheets to Set 1	8 edays	Tues 6/17/14	Tue 6/24/14
Field Crew Training Day: Wenck, HCR, Army	1 day	Tues 7/8/14	Tues 7/8/14
VI Open House (Location, Clayton County Library, Forest Park Branch)	0 days	Tues 7/8/14	Tues 7/8/14
Field Work- Summer Set 1			
Door to Door visits, well installation and groundwater sampling, soil gas probe sampling, and indoor/sub-slab, crawl space air sampling to run concurrently	45 days	Wed 7/9/14	Mon 9/8/14
Wenck/Army Review of Analytical Results and Incorporation into GIS Inventory	85 edays	Fri 7/25/14	Sat 10/18/14
Distribution of Analytical Results to homes (runs concurrently with sampling)	85 edays	Fri 7/25/14	Sat 10/18/14
Interim Report			
Submittal of Interim Report for Summer Sample Set 1 and Addendum to Work Plan to identify sampling for Set 2	0 edays	Wed 10/1/14	Wed 10/1/14
Army Review and Approval	14 edays	Wed 10/1/14	Tues 10/14/14
GA EPD and EPA Review and Approval (This will be an expedited review time)	14 edays	Tues 10/14/14	Tues 10/28/14
Community Involvement Plan Implementation			
Distribution of Fact Sheet 2A and letter to Set 2 Buildings of Interest	0 edays	Tues 11/11/14	Tues 11/11/2014
Community Meeting #1- To discuss Set 1 Sampling Results and to Give Residents in Set 2 the opportunity to ask questions (Public Meeting notice to go out 30 days prior to date)	0 edays	Thurs 11/20/14	Thurs 11/20/14
Field Work- Winter Set 1 and Set 2			

Fort Gillem Vapor Intrusion Study			
Task Name	Duration*	Start	Finish
Door to Door visits, well installation and groundwater sampling, soil gas probe sampling, and indoor/sub-slab, crawl space air sampling to run concurrently	45 days	Mon 1/5/15	Fri 3/6/15
Wenck/Army Review of Analytical Results and Incorporation into GIS Inventory	85 edays	Thurs 1/22/15	Fri 4/17/15
Distribution of Winter Set 1 and Set 2 analytical results to homes (runs concurrently with sampling)	85 edays	Thurs 1/22/15	Fri 4/17/15
Interim Submittal of Winter Set 1 and Set 2 Sampling Results			
Submittal of Interim Report for Winter Sample Set 1 and Sample Set 2	0 edays	Mon 4/20/15	Mon 4/20/15
GA EPD and EPA Review and Approval (This will be an expedited review time)	14 edays	Mon 4/20/15	Mon 5/4/15
Community Meeting #2- To discuss Winter Sample Set 1 and Sample Set 2 (Public Meeting notice to go out 30 days prior to date).	0 edays	Thurs 5/7/15	Thurs 5/7/15
Field Work - Summer Set 2			
Door to Door visits, groundwater sampling, and indoor/sub-slab, crawl space air sampling to run concurrently	45 days	Mon 7/6/15	Fri 9/4/15
Wenck/Army Review of Analytical Results and Incorporation into GIS Inventory	85 edays	Thurs 7/23/15	Fri 10/16/15
Distribution of Summer Set 2 analytical results to homes (runs concurrently with sampling)	85 edays	Thurs 7/23/15	Fri 10/16/15
Interim Submittal of Summer Set 2 Sampling Results			
Submittal of Interim Report for Summer Sample Set 2	0 edays	Mon 10/19/15	Mon 10/19/15
GA EPD and EPA Review and Approval (This will be an expedited review time)	14 edays	Mon 11/2/15	Mon 11/2/15
Community Meeting #3 - To discuss Summer Set 2 results (Public Meeting notice to go out 30 days prior to date). Meeting is Tentative.	0 edays	Thurs 11/5/15	Thurs 11/5/15
Reporting			
Submittal of Draft Reports for FTG-01, FTG-07/10, and FTG-09	0 days	Mon 11/16/15	Mon 11/16/15
Army Review	15 edays	Mon 11/16/15	Tues 12/1/15
Response to Comments	14 edays	Wed 12/3/15	Tues 12/15/15
Submittal of Draft Final Reports	0 days	Tues 12/15/15	Tues 12/15/15
GA EPD/EPA Review	30 edays	Tues 12/15/15	Thurs 1/14/16
Response to comments	14 edays	Fri 1/15/16	Thurs 1/28/16
Submittal of Final Reports	0 edays	Thurs 1/28/16	Thurs 1/28/16
GA EPD/EPA Approval	0 edays	Thurs 1/28/16	Fri 2/12/16
* edays: calendar days, days: working days			

Appendix B

Quality Assurance Project Plan

**UNIFORM FEDERAL POLICY
QUALITY ASSURANCE PROJECT PLAN**

**Vapor Intrusion (VI) Study
Fort Gillem Offsite Locations FTG-01, FTG-07/10, FTG-09**

Prepared for:

**U.S. Army Corps of Engineers
Savannah District
100 West Oglethorpe Avenue
Savannah, Georgia 31401-3640**

**May 2014
REVISION 1**

WENCK ASSOCIATES, INC.

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E Analytical Data Validation Forms	
F Data Qualification Procedures and Data Qualifier Definitions	
G Meeting Minutes for Project Planning Sessions	

QAPP Worksheet #1 & 2

Title and Approval Page

Site Name/Project Name: VI Study

Site Location: Off-Site Locations FTG-01, FTG-07/10, FTG-09

Contract: W912HN-13-D-0016, 0003

U.S. Army Corps of Engineers, Savannah, Georgia

Lead Organization

Tracey Epperley, Savannah, Georgia

Lead Organization Project Manager

U.S. Environmental Protection Agency (EPA), Region IV, Atlanta, Georgia

Federal Regulatory Agency

Georgia Environmental Protection Division (EPD), Atlanta, Georgia

State Regulatory Agency

HCR Construction, Inc., Atlanta, Georgia

Investigative Organization

Wenck Associates, Inc., Roswell, Georgia

Secondary Investigative Organization

Shane Waterman P.G., Wenck Associates, Inc.

Preparer's Name and Organizational Affiliation

1802 Wooddale Drive, Suite 100, Woodbury, MN

(651) 294-4588, swaterman@wenck.com

Preparer's Address, Telephone Number, and E-mail Address

March 3, 2014 (Rev. 0)

Preparation Date

Investigative Organization's Project Manager:

Signature

Heather Hawkins / Wenck Associates, Inc.

Date

Investigative Organization's QA Manager:

Signature

Shane Waterman / Wenck Associates, Inc.

Date

Lead Organizations' Project Managers:

Signature

Tracey Epperley / U.S. Army Corps of Engineers

Date

Signature

Jason Lennane / U.S. Army Corps of Engineers

Date

Signature

Owen Nuttall / BEC Ft. McPherson/Gillem

Date

Approval Signatures:

Georgia EPD Approval Signatures

Signature

Amy Potter, Unit Coordinator

Date

U. S. EPA Approval Signatures:

Signature

Ben Bentkowski, PG / Hydrologist

Date

Other Approval Signatures:

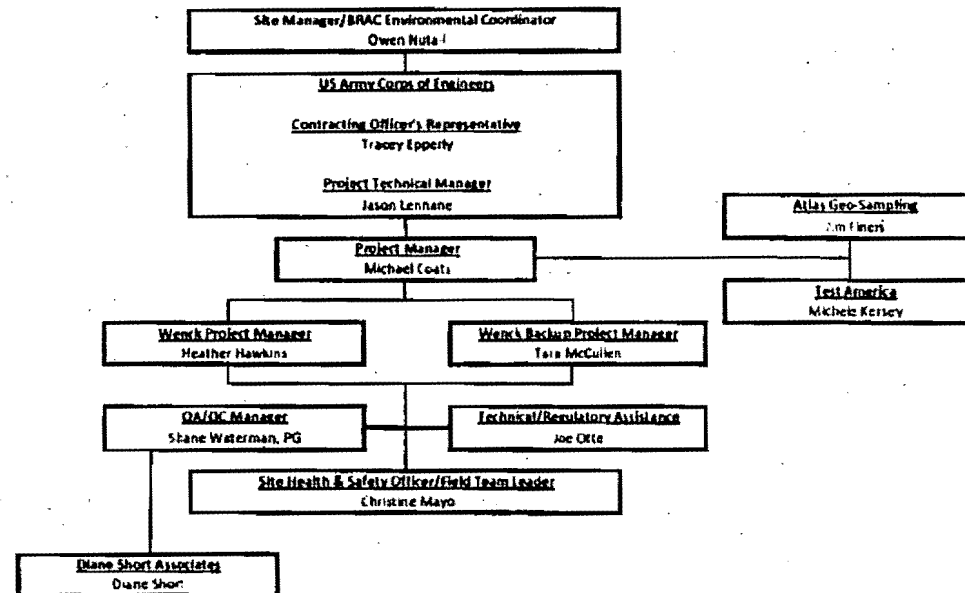
Signature

Michele Kersey / TestAmerica Project Manager

Date

QAPP Worksheet #3 & 5
Project Organization and QAPP Distribution

QAPP Recipients	Title	Organization	Telephone Number	E-mail Address
Owen Nuttall	Site Manager/BRAC Environmental Coordinator	ARMY	404-245-9203	owen.m.nuttall.civ@mail.mil
Tracey Epperley	Contracting Officer's Representative	USACE	912-652-5718	Tracey.Epperley@usace.army.mil
Jason Lennane	Project Technical Manager	USACE	912-652-5151	Jason.T.Lennane@usace.army.mil
Steven Bath	Technical Staff	USACE	912-652-5464	Steven.M.Bath@usace.army.mil
Michael Coats	Project Manager	HCR, Construction, Inc.	478-284-6909	mcoats@hcr-construction.com
Heather Hawkins	Project Manager	Wenck Associates, Inc.	678-987-5845	hhawkins@wenck.com
Shane Waterman	Quality Control	Wenck Associates, Inc.	651-294-4588	swaterman@wenck.com
Joe Otte	Technical Regulatory Assistance	Wenck Associates, Inc.	651-294-4587	jotte@wenck.com
Diane Short	Data Validator	Diane Short & Associates	303-271-9642	dsa@eazy.net
Michele Kersey	Project Manager	Test America, Inc.	912-354-7858	MKersey@testamericainc.com
Amy Potter	GAEPD Senior Project Manager	GAEPD	404-656-2833	amy.potter@dnr.state.ga.us
Jessica Turner	GAEPD Senior Geologist	GAEPD	404-656-2833	jessica.turner@dnr.state.ga.us
Mary Brown	GAEPD Senior Engineer	GAEPD	404-656-2833	mary.brown@dnr.state.ga.us
Ben Bentkowski	Hydrologist	USEPA	404-562-8507	bentkowski.ben@epa.gov
Cathy Amoroso	Project Manager	USEPA	404-562-8637	amoroso.cathy@epa.gov



QAPP Worksheet #4, 7 & 8
Personnel Qualifications and Sign-Off Sheet

Note: Project Personnel sign-off sheets will be obtained by the Wenck QA manager for key project personnel who have not already signed the approval page (Worksheet #1). The Wenck QA Manager will ensure that these sheets are kept on file and they are obtained prior to each person beginning any of their project work.

Organization: HCR Construction, Inc.

Project Personnel	Title	Education/Experience	Specialized Training/Certifications	Signature/Date
Michael Coats	Project Manager	See Note 1	See Note 1	

Organization: Wenck Associates, Inc.

Project Personnel	Title	Education/Experience	Specialized Training/Certifications	Signature/Date
Heather Hawkins	Project Manager	See Note 1	See Note 1	
Tara V. McCullen	Secondary Project Manager	See Note 1	See Note 1	
Shane Waterman	QA/QC Manager	See Note 1	See Note 1	
J. Joseph Otte	Technical/Regulatory Assistance	See Note 1	See Note 1	
Christine Mayo	Wenck Field Team Leader and Sampler	See Note 1	See Note 1	

Organization: TestAmerica, Inc.

Project Personnel	Title	Education/Experience	Specialized Training/Certifications	Signature/Date
Michele Kersey	Project Manager	See Note 1	See Note 1	
[to be determined]	Quality Control	See Note 1	See Note 1	

Organization: Diane Short Associates, Inc.

Project Personnel	Title	Education/Experience	Specialized Training/Certifications	Signature/Date
Diane Short	Project Data Validation	See Note 1	See Note 1	
[to be determined]	Quality Control	See Note 1	See Note 1	

Organization: Atlas Geo-Sampling

Project Personnel	Title	Education/Experience	Specialized Training/Certifications	Signature/Date
Jim Fineis	Project Manager	See Note 1	See Note 1	
[to be determined]	Field Team Driller	See Note 1	See Note 1	
[to be determined]	Field Team Driller	See Note 1	See Note 1	

Notes:

- 1) Resumes for each individual working on this project will be kept on file at each organization, and will be available to other organizations upon request.

QAPP Worksheet #6 Communication Pathways

Communication Driver	Steps In Process	Timing	Means of Communication
Amendment to the QAPP	1) Wenck notifies all document holders of a pending amendment.	ASAP, but prior to conducting affected work	Telephone or e-mail
	2) Wenck provides draft amendment to all document holders for review.	ASAP, but prior to conducting affected work	Hard copy by mail
	3) USACE coordinates comment resolution.	ASAP, but prior to conducting affected work	Telephone, e-mail, or meeting
	4) USACE coordinates amendment approval (signatures) of those persons who approved original QAPP and distributes amendment to document holders.	ASAP, but prior to conducting affected work	Hard copy by mail
Laboratory Deviation	1) Analyst notifies Laboratory Project Manager and QA Manager.	ASAP and within one business day	In person, by telephone, or e-mail
	2) QA Manager initiates Corrective Action Form.	Same day	Hard Copy
	3) Laboratory Project Manager (PM) notifies Wenck QA Manager.	ASAP and within one business day	Telephone or e-mail
	4) Wenck QA Manager notifies Wenck PM and USACE.	ASAP and within two business days	Telephone or e-mail
	5) USACE notifies BEC.	ASAP and within two business days	Telephone or e-mail
	6) BEC notifies GAEPD and USEPA.	ASAP and within two business days	Telephone or e-mail
	7) Approval of the means of resolution by GAEPD.	ASAP	e-mail
Field Work Deviation	1) Sampler notifies Wenck PM and QA Manager and documents in field notes.	ASAP and within one business day	In person, by telephone, or e-mail
	2) QA Manager orders sampler to stop work (if deemed necessary).	Same day	In person, by telephone, or e-mail
	3) Wenck PM notifies USACE.	ASAP and within two business days	Telephone or e-mail
	4) USACE notifies BEC.	ASAP and within two business days	Telephone or e-mail
	5) BEC notifies GAEPD and USEPA.	ASAP and within two business days	Telephone or e-mail
	6) Approval of the means of resolution by GAEPD.	ASAP	e-mail
Project Delay	1) Wenck PM notifies USACE.	ASAP	Telephone or e-mail
	2) USACE notifies BEC.	ASAP	Telephone or e-mail
	3) Approval of the means of resolution by BEC.	ASAP and within two business days	Telephone or e-mail
Laboratory Data Rejection	1) Wenck QA Manager notifies Wenck PM and USACE.	ASAP and within two business days	Telephone or e-mail
	2) USACE notifies BEC.	ASAP and within two business days	Telephone or e-mail
	3) BEC notifies GAEPD and USEPA.	ASAP and within two business days	Telephone or e-mail
	4) Approval of the means of resolution by GAEPD.	ASAP	e-mail

Notes:

- 1) Notifications by USACE and BEC may also be delegated by the USACE to the Wenck PM or Wenck QA Manager.
- 2) Any QAPP modification or deviation in QAPP procedures (field or laboratory) must be documented in writing.

QAPP Worksheet #9 Project Planning Session Summaries

Project Name <u>Vapor Intrusion Investigation</u> Projected Date(s) of Sampling: <u>2014-2015</u> Project Manager <u>Heather Hawkins</u>			Site Name <u>Vapor Intrusion (VI) Study Fort Gillem</u> Offsite Locations <u>FTG-01, FTG-07/10, FTG-09</u> Site Location <u>Fort Gillem, Forest Park, GA</u>	
Date of Session: <u>February 11, 2014</u> Scoping Session Purpose: <u>Scoping session</u>				
Name	Affiliation	Phone #	E-mail Address	Project Role
Michael Coats, PE	HCR Construction, Inc.	478-284-6909	mcoats@hcr-construction.com	Project Manager
Heather Hawkins	Wenck Associates, Inc.	678-987-5845	hhawkins@wenck.com	Project Manager - Wenck Tasks
Shane Waterman, PG	Wenck Associates, Inc.	651-294-4588	swaterman@wenck.com	Technical Support / QA Manager
Joe Otte	Wenck Associates, Inc.	651-294-4587	jotte@wenck.com	Technical / Regulatory Support
Owen Nuttall	BRAC	404-245-9203	owen.m.nuttall.civ@mail.mil	BRAC Environmental Coordinator
Tracey Epperley	USACE	912-652-5718	Tracey.Epperley@usace.army.mil	Contracting Officer's Representative
Jason Lennane	USACE	912-652-5151	Jason.T.Lennane@usace.army.mil	Project Technical Manager
Amy Potter	Georgia EPD	404-656-2833	amy.potter.dnr.state.ga.us	GAEPD Senior Project Manager
Jessica Turner	Georgia EPD	404-656-2833	jessica.turner@dnr.state.ga.us	GAEPD Senior Geologist
Ben Bentkowski	USEPA Region 4	404-562-8507	bentkowski.ben@epa.gov	Hydrologist
Cathy Amoroso	USEPA Region 4	404-562-8637	amorosp.cathy@epa.gov	Project Manager

Discussion Items: Need for vapor intrusion investigation, sampling approach, schedule

Action Items: Wenck to prepare a Work Plan and QAPP and submit to the USACE, GAEPD and USEPA for review and approval.

The minutes for this planning session and previous planning sessions can be found in Appendix G.

QAPP Worksheet #10
Conceptual Site Model

The Conceptual Site Model and Risk Evaluation for this project are discussed in detail in Section 2 of the Work Plan.

QAPP Worksheet #11
Project/Data Quality Objectives

Study Problem

While no existing completed exposure pathway for Vapor Intrusion (VI) has been documented to exist, the potential for VOC impacts to residential dwellings and commercial businesses near the facility boundaries exist, based on the mapped location of the VOC- impacted groundwater plumes emanating from the North Landfill Area (FTG-01) and the Southeast Burial Sites (FTG-07/10 and FTG-09).

Of particular concern are those dwellings with basements, crawl spaces, or constructed slab-on-slab grade over portions of the plume where VOC concentrations are highest. Particular consideration will also be given to areas where the distance to groundwater is very shallow (i.e., in areas near groundwater to surface water discharge features).

The Work Plan presents an approach to data collection to evaluate off-site potential receptors at risk of exposure through the VI pathway.

Study Goals

The goal of the study is to evaluate whether the off-site VOC-contaminated groundwater plumes associated with FTG-01, FTG-07/10, and FTG-09 provide a completed exposure pathway for Vapor Intrusion for the residential and commercial properties surrounding Fort Gillem.

Data to be Gathered during the Study

Groundwater Samples: Samples collected from the uppermost portions of the shallow groundwater table will be collected and analyzed for VOCs. Groundwater sample locations are shown in Figures 5 and 6 in the Work Plan.

Soil Gas: VOCs in soil gas will be analyzed using EPA Method TO-15. Soil gas sample locations are shown in Figures 5 and 6 in the Work Plan.

Sub-slab/crawl space, Indoor and Background Air Samples: VOCs in the air will be analyzed using EPA Method TO-15. Air sample locations are shown in Figures 5 and 6 in the Work Plan.

All samples will be analyzed by an off-site laboratory (TestAmerica, Savannah, GA).

Boundaries of the Study

The study areas are defined in Figure 2 and 3 of the Work Plan.

Data Quality Assurance/Quality Control

Data are to be definitive data, collected in accordance with the SOPs identified in this QAPP, meeting the QC limits identified in this QAPP (with QAPP-identified data qualifiers, where appropriate), and validated

(10% of the data collected).

Data Collection

Wenck Associates, Inc. and HCR, Inc. will collect samples. Samples will be picked up by Test America's courier service at Fort Gillem.

Data Reporting

TestAmerica will provide electronic copies (with raw data) of each analytical report (VOCs) to the Wenck QA Manager, who will then forward copies to the data validator (Diane Short). TestAmerica will also provide an electronic data deliverable (EDD) for each analytical report to the Wenck QA Manager. Using the EDDs, Wenck will prepare summary tables showing analytical results and present these tables in the Report.

Data Archiving

The electronic (pdf) copies of analytical reports and the data tables will be stored electronically on Wenck's network drive at the Maple Plain, Minnesota office location, which is backed up nightly and includes rotation of back-up tapes to an offsite location. All Wenck field notes will be photocopied and converted into electronic files and uploaded to Wenck's network drive.

QAPP Worksheet #12 Measurement Performance Criteria

Matrix	Groundwater				
Analytical Group	Volatile Organic Compounds				
Sampling Procedure ⁽¹⁾	Analytical Method/SOP ⁽²⁾	Data Quality Indicators (DQIs)	Measurement Performance Criteria ⁽³⁾	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Discussed in this Work Plan: "Vapor Intrusion Study Work Plan Fort Gillem, FTG-01, FTG-07/10, FTG-09 Clayton County, Georgia CTO Number: W912HN-13-D-0016 Delivery Order: 0003"	VOCs: SW846: 8260B (SA-VO-004)	Precision	RPD \leq 50% (or $\pm 4 \times$ RL if sample or duplicate is $< 5 \times$ RL)	Field Duplicates	S & A
		Accuracy & Precision	W/in laboratory in-house control limits	MS/MSD ⁽⁴⁾	S & A
		Accuracy	$< \frac{1}{2}$ RL	Method Blank	A
		Accuracy	W/in laboratory in-house control limits	Surrogates	A
		Accuracy	W/in laboratory in-house control limits	Laboratory Control Sample	A
		Precision	RPD \leq 50% (or $\pm 4 \times$ RL if sample or duplicate is $< 5 \times$ RL)	QA split sample ⁽⁵⁾	S&A
		Field Completeness	100%	Data Completeness Check	S
		Analytical Completeness	100%	Data Completeness Check	A

Notes:

- 1) Field sampling procedures are included in the Work Plan.
- 2) Reference number from QAPP Worksheet #23. Laboratory SOPs are included in Appendix A.
- 3) The limits shown above are the data validation limits (which are also shown in Appendix F). Note that it is acceptable for the laboratory control limits (Worksheet #28) to be narrower or wider than the data validation limits listed above.
- 4) MS/MSDs will be performed on samples collected from the site. Note that the percent recovery criterion does not apply if the sample concentration exceeds four times the spike concentration.

QAPP Worksheet #12
Measurement Performance Criteria Table (continued)

Matrix	Air				
Analytical Group	Volatile Organic Compounds				
Sampling Procedure ⁽¹⁾	Analytical Method/SOP ⁽²⁾	Data Quality Indicators (DQIs)	Measurement Performance Criteria ⁽³⁾	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
Discussed in this Work Plan: "Vapor Intrusion Study Work Plan Fort Gillem, FTG-01, FTG-07/10, FTG-09 Clayton County, Georgia CTO Number: W912HN-13-D-0016 Delivery Order: 0003"	EPA TO-15 (SOP BR-AT-004)	Precision	$RPD \leq 50\%$ (or $\pm 4 \times RL$ if sample or duplicate is $< 5 \times RL$)	Field Duplicates	S & A
		Accuracy	No detections exceeding the RL for the laboratory and $< MDL$ for validation	Method Blank (canister nitrogen blank)	A
		Precision	$RPD \leq 30\%$ (or $\pm 2 \times RL$ if sample or duplicate is $< 5 \times RL$)	Laboratory (Matrix) Duplicate	A
		Accuracy	Recovery 60-130%	Laboratory Control Sample	A
		Accuracy	Recovery 50-130%	Surrogates	A
		Precision	$RPD \leq 50\%$ (or $\pm 4 \times RL$ if sample or duplicate is $< 5 \times RL$)	QA split sample ⁽⁴⁾	S&A
		Sensitivity	RLs $< \text{Half the Action Level}$	RL Adequacy Check	A
		Field Completeness	100%	Data Completeness Check	S
		Analytical Completeness	100%	Data Completeness Check	A

Notes:

- 1) Field sampling procedures are included in the Work Plan.
- 2) Reference number from QAPP Worksheet #23. Laboratory SOPs are included in Appendix A.
- 3) The limits shown above are the data validation limits (which are also shown in Appendix F). Note that it is acceptable for the laboratory control limits (Worksheet #28) to be narrower or wider than the data validation limits listed above.
- 4) QA split samples are collected at the discretion of the MPCA and/or USEPA for analysis by an independent laboratory. The State may also submit such samples to an independent laboratory at their discretion.

QAPP Worksheet #13
Secondary Data Uses and Limitations

Secondary Data	Data Source	Data Generator(s)	How Data Will Be Used	Limitations on Data Use
Current groundwater and surface water quality, plume location and discharge locations, and general hydrogeology information.	Numerous data sources (refer to list of references in Work Plan Section 8.0)	Numerous (refer to list of references in Work Plan Section 8.0)	General understanding of the types and extent of contamination at FTG-01, FTG-07/10 and FTG-09.	None: water, soil gas and air sampling and associated analytical methods and procedures will be in accordance with this QAPP, and the specified project decision will be based on the data collected during this effort.

QAPP Worksheet #14/16
Project Tasks & Schedule

The project tasks are discussed in detail in Section 4.0 of the Work Plan. The schedule is provided in Appendix A of the Work Plan.

QAPP Worksheet #15**Project Action Limits and Laboratory-Specific Detection/Quantitation Limits**

Matrix: Groundwater
Analytical Group: VOCs

Method	SOP Number	Analytes	Laboratory Reporting Limit ⁽³⁾ (ug/L)
82608	SA-VO-004	Acetone	25.0
		Benzene	1.00
		Bromodichloromethane	1.00
		4-Bromofluorobenzene	---
		Bromoform	1.00
		Bromomethane	5.00
		2-Butanone	10.0
		Carbon disulfide	2.00
		Carbon tetrachloride	1.00
		Chlorobenzene	1.00
		Chloroethane	5.00
		Chloroform	1.00
		Chloromethane	1.00
		cis-1,2-Dichloroethene	1.00
		cis-1,3-Dichloropropene	1.00
		Cyclohexane	1.00
		Dibromochloromethane	1.00
		1,2-Dibromo-3-Chloropropane	1.00
		1,2-Dibromoethane	1.00
		Dibromofluoromethane	---
		1,2-Dichlorobenzene	1.00
		1,3-Dichlorobenzene	1.00
		1,4-Dichlorobenzene	1.00
		Dichlorodifluoromethane	1.00
		1,1-Dichloroethane	1.00
		1,2-Dichloroethane	1.00
		1,1-Dichloroethene	1.00
		1,2-Dichloropropane	1.00
		1,4-dioxane	50.0
		Ethylbenzene	1.00
		2-Hexanone	10.0
		Isopropylbenzene	1.00
		Methyl acetate	1.00
		Methylcyclohexane	1.00
		Methylene Chloride	5.00

QAPP Worksheet #15
Reference Limits and Evaluation Table (continued)

Matrix: Groundwater

Analytical Group: VOCs (cont'd)

Method	SOP Number	Analytes	Laboratory Reporting Limit ⁽³⁾ (ug/L)
8260B	SA-VO-004	4-Methyl-2-pentanone	10.0
		Methyl tert-butyl ether	10.0
		Naphthalene	5.0
		Styrene	1.00
		1,1,2,2-Tetrachloroethane	1.00
		Tetrachloroethene	1.00
		Toluene	1.00
		Toluene-d8 (Surr)	1.00
		trans-1,2-Dichloroethene	1.00
		trans-1,3-Dichloropropene	1.00
		1,2,4-Trichlorobenzene	1.00
		1,1,1-Trichloroethane	1.00
		1,1,2-Trichloroethane	1.00
		Trichloroethene	1.00
		Trichlorofluoromethane	1.00
		1,1,2-Trichloro-1,2,2-trifluoroethane	1.00
		Vinyl chloride	1.00
		Xylenes, Total	2.00

QAPP Worksheet #15
Reference Limits and Evaluation Table (continued)

Matrix: Air

Analytical Group: VOCs

Method	SOP Number	Analytes	Screening Levels ⁽¹⁾ (ug/m ³)	Laboratory Reporting Limit ⁽³⁾ (ug/m ³)
TO-15	BR-AT-004	Dichlorodifluoromethane	10	2.5
		Chlorodifluoromethane (Freon 22)	5200	1.8
		1,2-Dichlorotetrafluoroethane	---	1.4
		Chloromethane	9.4	1.0
		n-Butane	---	1.2
		Vinyl chloride	0.16	0.51
		1,3-Butadiene	0.081	0.44
		Bromomethane	0.52	0.78
		Chloroethane	1000	1.3
		Bromoethene (Vinyl Bromide)	0.31	0.87
		Trichlorofluoromethane	73	1.1
		Freon TF	3100	1.5
		1,1-Dichloroethene	21.0	0.79
		Acetone	3200	12
		Isopropyl alcohol	730	12
		Carbon disulfide	73	1.6
		3-Chloropropene	0.41	1.6
		Methylene Chloride	96	15
		tert-Butyl alcohol	---	15
		Methyl tert-butyl ether	9.4	0.72
		trans-1,2-Dichloroethene	6.3	0.79
		n-Hexane	73	0.70
		1,1-Dichloroethane	1.5	0.81
		Methyl Ethyl Ketone	520	1.5
		cis-1,2-Dichloroethylene	---	0.79
		1,2-Dichloroethylene, Total	---	0.79
		Chloroform	10	0.98
		Tetrahydrofuran	210	14
		1,1,1-Trichloroethane	520	1.1
		Cyclohexane	630	0.69
		Carbon tetrachloride	10	1.3
		n-Heptane	---	0.82
		Trichloroethene	0.43	1.1
		Methyl methacrylate	73	2.0
		1,2-Dichloropropane	0.24	0.92
		1,4-Dioxane	3.1	18
		Bromodichloromethane	0.066	1.3
		2,2,4-Trimethylpentane	---	0.93
		Benzene	3.1	0.64
		1,2-Dichloroethane	---	0.81
		cis-1,3-Dichloropropene	---	0.91
		methyl isobutyl ketone	310	2.0

QAPP Worksheet #15
Reference Limits and Evaluation Table (continued)

Matrix: Air

Analytical Group: VOCs (cont'd)

Method	SOP Number	Analytes	Screening Levels ⁽¹⁾ (ug/m ³)	Laboratory Reporting Limit ⁽³⁾ (ug/m ³)
TO-15	BR-AT-004	Toluene	520	0.75
		trans-1,3-Dichloropropene	---	0.91
		1,1,2-Trichloroethane	0.15	1.1
		Tetrachloroethylene	9.40	1.4
		Methyl Butyl Ketone (2-Hexanone)	3.1	2.0
		Dibromochloromethane	0.09	1.7
		1,2-Dibromoethane	0.0041	1.5
		Chlorobenzene	5.2	0.92
		Ethylbenzene	0.97	0.87
		m,p-Xylene	10	2.2
		o-Xylene	10	0.87
		Xylene (total)	10	0.87
		Styrene	100	0.85
		Bromoform	2.2	2.1
		Cumene	42	0.98
		1,1,2,2-Tetrachloroethane	0.042	1.4
		n-Propylbenzene	100	0.98
		4-Ethyltoluene	---	0.98
		1,3,5-Trimethylbenzene	---	0.98
		2-Chlorotoluene	---	1.0
		tert-Butylbenzene	---	1.1
		1,2,4-Trimethylbenzene	0.73	0.98
		sec-Butylbenzene	---	1.1
		4-Isopropyltoluene	---	1.1
		1,3-Dichlorobenzene	21	1.2
		1,4-Dichlorobenzene	0.22	1.2
		Benzyl chloride	0.10	1.04
		n-Butylbenzene	---	1.1
		1,2-Dichlorobenzene	21	1.2
		1,2,4-Trichlorobenzene	0.21	3.7
		Hexachlorobutadiene	0.11	2.1
		Naphthalene	0.072	2.6

Notes:

- 1) For the purpose of this study, Wenck will use the most recent (November 2013) EPA Risk Screening Levels (RSLs) for residential air. (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/Index.htm).
- 2) Project Reporting Limit Goals are the Action Level divided by a factor of 2.
- 3) Reporting Limits are equivalent to "practical quantitation limits." Method detection limits will generally be 2 to 10 times lower than reporting limits.

QAPP Worksheet #17
Sampling Design and Rationale

Sampling Design and Rationale is discussed in Section 5 of the Work Plan.

QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Sampling Location/ID Number	Matrix	Depth (ft)	Analytical Group	Total Number of Samples	Sampling SOP Reference	Rationale for Sampling Location
Off-site properties associated with FTG-01, FTG-07/10, and FTG-09	Groundwater	Shallow groundwater table (sample depths will vary)	VOCs	60	Refer to Section 5.0 of the Work Plan	Refer to Section 5.0 of the Work Plan
	Soil gas	Two samples at each location. (one sample at 3' bg and one sample from 5' above the water table)	VOCs	53	Refer to Section 5.0 of the Work Plan	Refer to Section 5.0 of the Work Plan
	Indoor Air / sub-slab / crawl space / Background	Indoor Air = ambient Sub-slab = 6" below slab Crawl space = ambient	VOCs	Indoor air = 1 sample per dwelling Sub-slab = 2 samples per dwelling Crawl space = 1 sample per dwelling Background = 1 sample per 5 dwellings TOTAL = 652	Refer to Section 5.0 of the Work Plan	Refer to Section 5.0 of the Work Plan

QAPP Worksheet #19 & 30
Sample Containers, Preservation, and Hold Times

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Accreditation Expiration Date ³	Containers ^(1 & 2)	Preservation Requirements	Maximum Holding Time (preparation/analysis)	Data Package Turnaround
Groundwater	VOCs	SW-846 Method 8260B SOP SA-VO-004	February 28, 2015	2-40 mL vials with 10 mL of Methanol	Methanol ≤ 6° C	14 days	21 days
Air	VOCs	L EPA TO-15 SOP BR-AT-004	February 28, 2015	1-Liter Passivated Summa Canister (soil gas and sub-slab samples) 6-Liter Passivated Summa Canister (indoor air, background, and crawl space samples)	None	30 Days	21 days

Notes:

- 1) See Worksheet #23.
- 2) Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted. (Not VTSR).
- 3) Accreditations for TestAmerica in Savannah can be found in Appendix A.

QAPP Worksheet #20

Field QC Summary

Matrix	Analytical Group	No. of Sampling Locations (estimated)	No. of Field Duplicate Pairs ⁽³⁾	Matrix Spikes/Matrix Spike Duplicates	Field Blanks	Trip Blanks	Rinsate Blanks	Total No. of Samples to Lab
Groundwater	VOCs	40 ⁽¹⁾	4	2 ⁽⁴⁾	4	6 ⁽⁶⁾	4	60
Soil Gas	VOCs	48 ⁽¹⁾	5	NA ⁽⁵⁾	NA	NA	NA	53
Air	VOCs	592 ⁽²⁾	60	NA ⁽⁵⁾	NA	NA	NA	652

Notes:

- 1) Twenty sample locations multiplied by two sampling events (summer and winter).
- 2) Assumes two sub-slab samples per dwelling (92 dwellings), one indoor air sample per dwelling multiplied by two sampling events (summer and winter) and five background samples per every approximately five dwellings (20 background samples per event or 40 total).
- 3) Field duplicates will be collected at a minimum rate of 10% for each sampling event.
- 4) Two extra pairs of vials of groundwater will be collected at MS/MSD locations for VOC analysis. MS/MSD samples will be collected at ratio of 1:20.
- 5) Not applicable to TO-15 Method.
- 6) One trip blank will be submitted per sample cooler.

QAPP Worksheet #21

Field SOPs

Field SOPs are discussed in Sections 5.0 and 6.0 of the Work Plan.

QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	Work Plan Section No.
Water Sample Bottles (lab provided)	Groundwater Sampling	Prior to each event	Certificate verifies clean ⁽¹⁾	Replace with new bottles	Field Sampler	5.0
Summa Canisters (lab provided)	Soil Gas Sampling	Prior to each event	Batch Certification documentation verifies clean ⁽²⁾	Replace with new canister	Field Sampler	5.0
GPS Unit	Note 3	Daily (minimum)	Verify Agreement with Benchmark ⁽³⁾	Recalibrate as Needed	Field Sampler	5.0

Notes:

- 1) Review laboratory Certificates of Analysis to verify sample bottle cleanliness, and file this documentation.
- 2) Review laboratory Batch Certification documentation upon receipt of canisters to verify cleanliness, and file this documentation.
- 3) Calibrate the GPS Unit to a control point (i.e., a known benchmark) near the project site (or calibrate at project start with daily verification at a benchmark).

QAPP Worksheet #23
Analytical SOPs

Analytical SOP⁽¹⁾	Title, Date, and URL (if available)	Definitive or Screening Data	Analytical Group	SOP Option or Equipment Type	Modified for Project Work? (Y/N)
SOP BR-AT-004	"Determination of VOCs in Ambient Air by GC/MS (EPA Compendium Methods TO14 and TO15) (Rev 7, 09/25/09)	Definitive	Air Volatiles	GC/MS	No
SOP SA-VO-004	"Volatile Organic Compounds by GC/MS" (Rev. 1, 10/23/13)	Definitive	VOCs	GC/MS	No

Notes:

- 1) Laboratory SOPs are included in Appendix A.

QAPP Worksheet #24
Analytical Instrument Calibration

Instrument	Calibration Procedure	Calibration Range	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for CA	SOP Reference ⁽¹⁾
GC/MS	Tune Standard	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Prior to initial calibration and every 24 hours	Refer to the laboratory SOP	Correct Problem. Reanalyze. No samples may be analyzed without a valid tune.	Laboratory Analyst	SOP BR-AT-004
	Initial Calibration	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Prior to sample analysis and when CCV fails	RSD for each analyte \leq 30% with 2 exceptions up to 40%	Correct problem and repeat calibration	Laboratory Analyst	SOP BR-AT-004
	Initial Calibration Verification (ICV)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Once after each ICAL	%R for all analytes within 70-130	Correct Problem. Reanalyze, re-make, re-verify & re-analyze. If that fails, re-make all standards and repeat calibration.	Laboratory Analyst	SOP BR-AT-004
	Continuing Calibration Verification (CCV)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Daily before sample analysis after tune standard	%D \leq 30	Correct Problem. Reanalyze once. If that fails, see section 10.2.5 for instruction.	Laboratory Analyst	SOP BR-AT-004
	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Refer to the laboratory SOP (Section 9.0 & Attachment 3)	Laboratory Analyst	SOP SA-VO-004

Notes:

- 1) Laboratory SOPs are included in Appendix A.

QAPP Worksheet #25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection

Instrument	Maintenance/Testing/Inspection Activity	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for CA	SOP Reference ⁽¹⁾
GC/MS	Refer to the laboratory SOP (Attachment 4)	Refer to the laboratory SOP (Attachment 3)	Refer to the laboratory SOP (Attachment 3)	Refer to the laboratory SOP (Attachment 3)	Laboratory Analyst	SOP SA-VO-004
GC/MS (Air)	Check GC / Entech Column Interface, Check Nitrogen Tank Volume, Check Nitrogen Valves Software and Valves, Cut 2-3 inches from GC Column)	As required	Passing calibration	Perform maintenance, check standards, recalibrate	Laboratory Analyst	SOP BR-AT-004

Notes:

- 1) Laboratory SOPs are included in Appendix A.

QAPP Worksheet #26 & 27
Sample Handling, Custody, and Disposal

Sampling Organization: WenckLaboratory: TestAmericaMethod of sample delivery (shipper/carrier): shipper - FedExNumber of days from reporting until sample disposal: 45-60 days

Activity	Organization and Title Responsible Person	Work Plan Section / SOP Reference
Sample Labeling	Wenck	6.0
Chain-of-Custody Form Completion	Wenck	6.0
Packaging	Wenck/TestAmerica	6.0
Shipping Coordination	Wenck/TestAmerica	6.0
Sample receipt, Inspection & Log-in	TestAmerica	SA-CU-01 rev. 9
Sample Custody and Storage	TestAmerica	SA-CU-01 rev. 9
Sample Disposal	TestAmerica	Addendum to the Environmental Health and Safety Manual (01/01/14)

QAPP Worksheet #28
Analytical Quality Control and Corrective Action

Matrix	Groundwater
Analytical Group	Volatile Organic Compounds
Sampling SOP	See note ¹⁾
Analytical SOP	SOP# SA-VO-004 ²⁾
Field Sampling Firm	Wenck
Analytical Organization	TestAmerica
No. of Sample Locations	60

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	1 per Prep Batch ³⁾	< 1/2 RL	Note 2	Analyst	Contamination
LCS	1 per Prep Batch	W/in laboratory in-house control limits	Note 2	Analyst	Accuracy
MS/MSD	1 per SDG ⁴⁾	W/in laboratory in-house control limits	Note 2	Analyst	Accuracy and Precision
Surrogates	Every sample	W/in laboratory in-house control limits	Note 2	Analyst	Accuracy
Initial and Continuing Calibration	Note 5	Note 5	Note 2	Analyst	Accuracy
Equipment Rinse Blanks	10% for project ⁵⁾	Note 7	Note 7	Note 7	Accuracy
Field Duplicates	10% for project ⁶⁾	Note 7	Note 7	Note 7	Precision

Notes:

- 1) Field sampling procedures are included in the Work Plan.
- 2) Refer to TestAmerica Savannah SOP# SA-VO-004 (Section 9 and Attachment 3).
- 3) A preparation batch is defined as any group of samples of the same matrix that are prepared together, up to 20 samples.
- 4) A Sample Delivery Group (SDG) will consist of up to 20 samples of the same matrix that are analyzed and reported together.
- 5) Refer to TestAmerica Savannah SOP# SA-VO-004 (Section 9 and Attachment 3).
- 6) Field duplicates and equipment rinse blanks will be collected at a rate of 10% for the project (individual events do not need to exceed 10%).
- 7) There are no Method/SOP acceptance limits or corrective action for these QC samples. The data validator will review the results for these QC samples and will then qualify the sample results, as necessary, based on the data qualification procedures specified in Appendix F.

QAPP Worksheet #28
Analytical Quality Control and Corrective Action (continued)

Matrix	Air
Analytical Group	Volatile Organic Compounds
Sampling SOP	See note ¹⁾
Analytical SOP	SOP BR-AT-004
Field Sampling Firm	Wenck
Analytical Organization	TestAmerica
No. of Sample Locations	705

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits*	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)
Method Blank	Once every 24 hours	< LOQ	Reanalyze along with associated samples, unless detects for same compounds found in blank are greater than 10X the concentration found in the blank.	TestAmerica Laboratory	Contamination
Laboratory Control Sample	Once every 24 hours	%R = 70-130%	Reanalyze LCS, re-prep and reanalyze LCS and all associated samples if sufficient sample volume is available. If corrective action not successful, initiate nonconformance report and qualify sample results.	TestAmerica Laboratory	Accuracy
Internal Standard	Each field, standard, and QC sample	±40% area response from last acceptable calibration. RT ±0.33 min (20 seconds) from last acceptable calibration.	Reanalyze Sample	TestAmerica Laboratory	Instrument Performance
Method Detection Limits	Annual	Per Laboratory SOP	Reanalyze MDL	TestAmerica Laboratory	Sensitivity
Initial and Continuing Calibration	Per Laboratory SOP	Per Laboratory SOP	Per Laboratory SOP	Analyst	Accuracy
Field Duplicates	10% (minimum)	Note 3	Note 3	Wenck QC Manager	Precision

* Note that it is acceptable for the laboratory control limits to be narrower or wider than the data validation limits listed in Worksheet #12 and Appendix F.

Notes:

- 1) Field sampling procedures are included in the Work Plan.
- 2) Laboratory SOPs are included in Appendix A.
- 3) There are no Method/SOP acceptance limits or corrective action for these QC samples. The data validator will review the results for these QC samples and will then qualify the sample results, as necessary, based on the data qualification procedures specified in Appendix G.

QAPP Worksheet #29
Project Documents and Records

Sample Collection Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records
Field Notes (see Field SOPs F-1, F-2 and F-3 in Appendix B for specific items to include)	Sample Receipt, Custody, and Tracking Records	Field Audit Forms
Chain-of-Custody	Standard Traceability Logs	Laboratory Audit Forms
Air Bills	Equipment Calibration Logs	Data Verification Forms
Custody Seals	Sample Prep Logs	Data Validation Reports
Telephone Logs and E-mail	Run Logs	Corrective Action Forms
Corrective Action Forms	Equipment Maintenance, Testing, and Inspection Logs	Corrective Action Tracking Forms
Certificates of Analysis (bottle cleanliness)	Corrective Action Forms Reported Field Sample Results Reported Results for Standards, QC Checks, and QC Samples Instrument Printouts (raw data) for Field Samples, Standards, QC Checks, and QC Samples Sample Disposal Records Telephone Logs and E-mail Extraction/Clean-up Records Raw Data (electronically stored)	Telephone Logs and E-mail

Notes:

- 1) Wenck will retain sample collection and data assessment documents and records for a minimum period of 10 years. Records will be offered to the USEPA prior to destruction or disposal.
- 2) TestAmerica will retain Analytical documents and records for a minimum period of 5 years, after which they will transfer files to Wenck, who will retain them for a minimum period of 10 years.
- 3) Laboratory SOPs for documentation and records (included in Appendix A).

QAPP Worksheet #31, 32 & 33
Assessments and Corrective Action

Assessment Type	Frequency	Responsible Organization	Estimated Dates	Assessment Deliverable	Deliverable Due Date
Field Sampling Technical System Audit	Once at beginning of sampling	Wenck	Wenck QA Manager (or Senior QA personnel)	Wenck Lead Sampling Staff	Wenck QA Manager
Laboratory Technical Performance Audit	Annual (minimum)	TestAmerica	TestAmerica Quality Manager (or designee)	TestAmerica Laboratory Supervisor	TestAmerica Quality Manager

Notes:

- 1) TestAmerica is externally audited by the Georgia Environmental Protection Division as well as other states in which they maintain certifications. A copy of TestAmerica's Certification is included in Appendix A.
- 2) TestAmerica will not be routinely audited by the USACE or USEPA; however, the USACE or USEPA reserve the right to audit the laboratory.

QAPP Worksheet #31, 32 & 33
Assessments and Corrective Action (continued)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Beginning Implementation of Response
Field Sampling Technical System Audit	Written Audit Report ^{(1) & (2)}	Wenck QA Manager and Wenck Project Manager ⁽³⁾	ASAP and within 1 business day	E-mail or Letter	Wenck Lead Field Staff	1 business day
Laboratory Technical Performance Audit	Written Audit Report	TestAmerica Project Manager and General Manager ⁽⁴⁾	ASAP and within 1 business day	Corrective Action Form	TestAmerica Laboratory Supervisor and General Manager	1 business day

Notes:

- 1) The field audit form to be used is included as Appendix C.
- 2) The Corrective Action Tracking Form to be maintained by the Wenck QA Manager is included as Appendix D.
- 3) Wenck Project Manager will notify the USACE's Representative within two business days, who will then notify USEPA and GAEPD Project Managers within two business days.
- 4) Laboratory Project Manager will notify the Wenck QA Manager within one business day. The Wenck QA Manager will then notify the Wenck Project Manager within two business days, who will then notify USACE Project Managers within two business days.

QAPP Worksheet #34
Data Verification and Validation Inputs

Item	Description	Verification (completeness)	Validation (conformance to specifications)
Planning Documents/Records			
1	Approved Work Plan and QAPP	X	
2	Field SOPs	X	
3	Laboratory SOPs	X	
Field Records			
4	Field logbooks	X	X
5	Equipment calibration records	X	X
6	Chain-of-custody forms	X	X
7	Sample location maps	X	X
8	Drilling logs	X	X
9	Relevant project correspondence	X	X
10	Field audit reports	X	X
11	Field corrective action reports	X	X
Analytical Data Package			
12	Cover sheet (laboratory identifying information)	X	X
13	Case narrative	X	X
14	Sample receipt records	X	X
15	Internal chain-of-custody	X	X
16	Sample chronology (i.e., dates and times of receipt, preparation and analysis)	X	X
17	Communication records	X	X
18	Project specific PT sample results	X	X

Item	Description	Verification (completeness)	Validation (conformance to specifications)
19	LOD/LOQ establishment and verification	X	X
20	Standards traceability	X	X
21	Instrument calibration records	X	X
22	Definition of lab qualifiers	X	X
23	Results reporting forms	X	X
24	QC sample results	X	X
25	Corrective action reports	X	X
26	Electronic data deliverables	X	X

Notes:

1) Verification of analytical report completeness will also be conducted externally by Diane Short as part of Data Validation (see Worksheet #35).

**QAPP Worksheet #35
Verification (Step I) Process Table**

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Field Documentation	Field documentation will be reviewed to verify that required documentation was completed by the field sampler. For this verification step, the field sampler will provide copies of field notes, chain-of-custody, Summa canister batch certification and any information regarding sampling deviation or corrective action. Verify that all required samples were collected and that all required analyses/analytes were requested.	Internal	Wenck QA Manager
Field Audit Forms and Corrective Action Documentation	Verify that field audit forms and corrective action documentation (if any) are completed and properly filed.	Internal	Wenck QA Manager
Laboratory Documentation	Verify that all laboratory documentation (see Worksheet #29) is properly filed in accordance with laboratory SOPs.	Internal	TestAmerica Supervisor
Analytical Report	Verify that analytical reports are complete and technically accurate prior to mailing to Wenck ⁽¹⁾ .	Internal	TestAmerica Project Manager
Laboratory Audit and Corrective Action Forms	Verify that laboratory audit forms and corrective action forms (if any) are completed and properly filed.	Internal	TestAmerica QA Manager

Notes:

1) Verification of analytical report completeness will also be conducted externally by Diane Short as part of Data Validation (see Worksheet #36).

QAPP Worksheet #36
Data Validation (Steps IIa and IIb) Procedures

Data Validator: Diane Short Associates

Records Reviewed	Requirement Documents	Process Description	Responsible Person, Organization
Field Logbook	Section 6.0 of the Work Plan	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that meteorological data were provided for each day of field activities. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed and results are documented.	Shane Waterman (Wenck QA Manager)
Chain-of custody forms	Section 6.0 of the Work Plan	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the CoCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Shane Waterman (Wenck QA Manager)
Laboratory reports	QAPP	Verify the completeness of chain-of-custody records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that sufficient sample volume is available for QC samples (e.g., MS/MSD). Verify that all required signatures and dates are present. Check for transcription errors.	Diane Short Associates
Audit reports and Corrective action reports	QAPP	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	Diane Short Associates

Notes:

- 1) Validation of field and analytical data will be performed on 10% of the data collected during the project.
- 2) Compliance with methods and procedures will be determined by comparison with the Work Plan and QAPP requirements. Compliance with method performance criteria will be determined by comparison with QAPP-specified performance criteria (Worksheets 12, 15, and 20). National Functional Guidelines for Organic Data Review (USEPA, June 2008) will be used as guidance where QAPP requirements are not specific.
- 3) Data qualification procedures and definitions are included in Appendix F.

QAPP Worksheet #37 Usability Assessment

Summarize the usability assessment process:

Wenck's QA personnel will validate all field data in accordance with Worksheet #35, and Diane Short Associates will validate the analytical data in accordance with Worksheet #35 and #36. The Wenck Project Manager will then determine if the analytical data met the data quality objectives outlined in the QAPP. The results of laboratory data will be compared to the criteria outlined in Worksheets #12, #15 and #28.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

Data validation procedures will include evaluation of the following: sample identification, sample preparation, analyses within holding time, instrument calibration data, QC sample results, method blank contamination, precision and accuracy. The validator will apply qualifiers as needed to reflect limitations on the data if necessary. Data that do not meet the data quality objectives outlined in the QAPP will be clearly identified so data the data user is aware of any limitations associated with the data. Details of any outliers in the data will be provided in the data usability summary.

Identify the personnel responsible for performing the usability assessment:

Data validation will be performed by Diane Short Associates, Inc. under the supervision of the Wenck Project Manager. The usability assessment will be performed by Wenck QA personnel after the validation is complete.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

The results of the data review will be provided in the data usability summary. The validator will assign standard qualifiers to any data that do not meet the data quality objectives outlined in this QAPP. The qualifiers will be entered into the database so that data users can easily note any limitations associated with a result. The qualification may also include rejection of data points if necessary. The following items will be assessed during the validation process:

Condition upon receipt – Evaluation of any anomalies noted during sample receipt and sample condition upon receipt.

Holding time – Both sample preparation and analysis holding time.

Calibration – Instrument calibration and verification will be evaluated to confirm that instruments were properly calibrated.

Blanks – Method blanks, field blanks, equipment, and trip blanks will be evaluated for potential bias.

Accuracy – Laboratory control samples, organic surrogates and matrix spike samples will be evaluated for recovery and any potential impact upon reported results and compared to goals listed in Worksheet #28 [laboratory] and Worksheet 12 and Appendix F reports [validator].

Accuracy (percent recovery) will be calculated by dividing the laboratory-determined result (with correction for any amount found in the parent sample in the case of a MS) by the true value of the added spike amount, expressed as a percentage.

Precision – RPDs will be evaluated and compared to goals listed in Worksheet #28 [laboratory] and Worksheet 12 and Appendix F reports [validator]. RPDs are not used to qualify data when the analyte concentrations are 5 times or less the RL. Precision (RPD) will be calculated by dividing the absolute value of the difference between the two results by the mean of the two results, expressed as a percentage.

Sensitivity – Reporting limits will be reviewed to those listed in Worksheet #15 in conjunction with noted matrix effects as noted in the data.

Representativeness – Representativeness reflects the ability of the field staff to collect samples that are representative of the site by properly collecting groundwater and air samples that are representative of the media. This will be accomplished by review of the field data to ensure that sample collection and handling was performed as per the goals outlined in this QAPP. Laboratory representativeness measures the ability of laboratory staff to obtain representative samples from the sampling containers that are received. Laboratory representativeness is typically derived by use of established laboratory methods which have method specifications to ensure that data will be representative..

Completeness –Completeness will be evaluated for two different elements: field completeness and laboratory completeness. Field completeness is the number of samples collected (i.e., delivered to the laboratory intact) out of the number of samples planned to be collected, expressed as a percentage. Laboratory completeness is the number of samples for which valid data are obtained (rejected data are not counted) out of the number of samples that were sent to the laboratory, expressed as a percentage. The completeness calculation will take into account the number of valid analytes reported, given that individual analytes may be rejected while most other analytes remain valid. Any rejected data will be discussed with the USACE, GAEPD and USEPA prior to deciding the usability of the data for the intended purpose, and whether any resampling is required.

Comparability – Comparability of field data will be ensured by review of sampling records to verify that sampling was performed in a consistent manner. Laboratory comparability is typically derived by use of established laboratory methods which have method specifications to ensure that data will produce comparable results.

Appendix A

Laboratory Information (CD)

Appendix B

Field Audit Form

FIELD AUDIT FORM

Site/Event:	
Sampling Firm:	
Auditor's Name(s): (print & sign)	
Sampler's Name(s): (print & sign)	
Date Conducted:	

Are the sample containers that are being used in accordance with QAPP, with regard to container size and type, use of correct preservatives, and were copies of the Certificate(s) of Analysis for bottle cleanliness received and properly filed?	Yes No (circle one)
Comments:	

Is sample labeling being performed in accordance with the procedures in QAPP SOPs F-1, F-2, and F-3 with regard to including all required information, using proper sample numbering format, and labeling of field duplicates to be blind to the laboratory?	Yes No (circle one)
Comments:	

Is sample collection being performed in accordance with the procedures in QAPP SOPs F-1, F-2 and F-3 with regard to use of proper equipment, use of clean nitrile gloves at each location, and sample collection procedures?	Yes No (circle one)
Comments:	

Is equipment decontamination being performed in accordance with the procedures in QAPP SOP F-4, with regard to type of decontamination fluids, decontamination of sampling equipment between sampling locations, and spent decontamination fluid disposal?	Yes No (circle one)
Comments:	

FIELD AUDIT FORM (cont'd)

Have sampling personnel received adequate training, in accordance with the QAPP?	Yes No (circle one)
--	---------------------------

Comments:

Is field documentation being performed in accordance with the procedures in QAPP SOPs F-1, F-2 and F-3 with regard to completing logbooks (bound, entries in ink, cross-outs are initialed, required information is documented)?	Yes No (circle one)
--	---------------------------

Comments:

Is field documentation being performed in accordance with the procedures in QAPP SOPs F-1, F-2 and F-3 with regard to completing Chain-of-Custody forms (entries in ink, cross-outs are initialed, required information is properly filled out, shipping bill number is documented, and all transfers are documented with signature/date/time)?	Yes No (circle one)
---	---------------------------

Comments:

Is sample shipping being performed in accordance with the procedures in QAPP SOPs F-1, F-2 and F-3 with regard to use of packing material (e.g., bubble wrap), placement of Chain-of-Custody in a Ziplock bag (saving at least 1 copy), adequate ice quantity, clear packing tape used, custody seals used (at least 2), and sample delivery to the laboratory?	Yes No (circle one)
---	---------------------------

Comments:

FIELD AUDIT FORM (cont'd)

Additional Comments:

Action Items (if any):

FIELD AUDIT FORM (cont'd)

Follow-up Audits (if any):

Appendix C

Corrective Action Tracking Form

[illegible]

Appendix D

Field Data Validation Form

DATA VALIDATION FORM FOR ORGANICS AIR TO-15

SDG NUMBER _____

PROJECT: _____

LABORATORY: Pace Analytical, Minneapolis, MN

SAMPLE MATRIX: Air

SAMPLING DATE(S): _____ NO. OF SAMPLES: _____

ANALYSES REQUESTED: VOCs in air

SAMPLE NO. _____

DATA REVIEWER: _____ INITIALS/DATE: _____

QA REVIEWER: _____

Telephone Logs included Yes ☐ No ☐

Contractual Violations Yes ☐ No ☐

Comments:

I. DELIVERABLES

A. All deliverables were present as specified in the QAPP.

Yes ____ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ____ No ____

B. Holding Times

The required holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).

Yes ____ No ____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes ____ No ____

2. Samples were received at the required temperature and preservation.

Yes ____ No ____

3. Canister Pressure

Canister pressures were measured and recorded for initial vacuum check, initial field vacuum, final field reading, lab initial pressure and final pressure.

Yes ____ No ____

4. All readings met the limits or exceptions were noted and pressure corrected

Yes ____ No ____

III. INSTRUMENT CALIBRATION - GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of 0.05.

Yes ____ No ____ NA ____

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.

Yes ____ No ____ NA ____

2b. The average relative standard deviation (RSD) for all spiked compounds was less than 30% (40% Poor responders).

Yes ____ No ____ NA ____

3. The 12 hour system Performance Check was performed as required in SW-846.

Yes ____ No ____ NA ____

B. Continuing Calibration

1. The RRF 50 standard was analyzed for each analysis at the required frequency and the QC criteria or 0.05 were met.

Yes ____ No ____ NA ____

2. The percent difference (%D) limits for the CCC's of $\pm 25\%$ (40% poor responders) were met.

Yes ____ No ____ NA ____

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ____ No ____ NA ____

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.

Yes ____ No ____ NA ____

VI. SURROGATE

Surrogate spikes were analyzed with every sample.

Yes ____ No ____

And met the recovery limits defined in the QAPP of 50 – 130%.

Yes ____ No ____

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ____ No ____

Spikes are not amenable to canister and are not performed.

B. The canister/matrix duplicate was analyzed and the RPD was within the QAPP limits of 30% RPD unless the result is $< 5 \times \text{RL}$. In which case, the limit is a difference of $\pm 2 \times \text{RL}$.

Yes ____ No ____

VIII. DUPLICATE CONTROL SAMPLES

A. Duplicate Control and Duplicate Control Sample Duplicates similar to Laboratory Control Samples (LCS) were performed for every set.

Yes ____ No ____

B. And percent recoveries were acceptable at 60 – 130% (poor responders 40%).

Yes ____ No ____

C. And Relative Percent Differences were within lab limits or 30% RPD

Yes ____ No ____ NA ____

IX. BLANKS

A. Method (nitrogen) Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ____ No ____

B. No blank contamination was found in the Method Blank.

Yes ____ No ____

C. If Equipment Rinsate Blanks were identified, no blank contamination was found.

Yes ____ No ____ NA ____

D. Contamination level was less than 0.03 mg/cubic meter before samples were analyzed per the method.

Yes ____ No ____ NA ____

A representative set of canisters should be screened for contamination at the laboratory for each SDG.

The screen will be at the lowest level of requested detection.

X. FIELD QC

If Field duplicates were identified, they met the $\leq 50\%$ RPD criteria for the project, or $\pm 4 \times \text{RL}$ for results $< 5 \times \text{RL}$. If sufficient field duplicates are available for statistical review, the precision criteria may be expanded as canisters are co-located samples.

Yes ____ No ____ NA ____

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes ____ No ____ NA ____

B. The suggested EQL's for the sample matrices in this set were met

Yes ____ No ____ NA ____

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for 10% of detected compounds.

Yes ____ No ____ NA ____

B. Quantitation was checked to determine the accuracy of calculations for representative compounds in one internal standards quantitation set.

Yes ____ No ____ NA ____

XIII. TENTATIVELY IDENTIFIED COMPOUNDS

TICs were properly identified and met the library identification criteria.

Yes ____ No ____ NA ____

XIV. OVERALL ASSESSMENT OF THE CASE

DATA VALIDATION FORM FOR ORGANICS GC

SDG NUMBER _____

PROJECT: _____

LABORATORY: Pace Analytical, Minneapolis, MN

SAMPLE MATRIX: Soil

SAMPLING DATE(S): _____ NO. OF SAMPLES: _____

ANALYSES REQUESTED: PCBs

SAMPLE NO. _____

DATA REVIEWER: _____ INITIALS/DATE: _____

QA REVIEWER: _____

Telephone Logs included Yes _____ No _____

Contractual Violations Yes _____ No _____

Comments:

I. DELIVERABLES

A. All deliverables were present as specified in the QAPP.

Yes ____ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ____ No ____

B. Holding Times

1. The required holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).

Yes ____ No ____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes ____ No ____

2. Samples were received at the required temperature and preservation.

Yes ____ No ____

III. INSTRUMENT CALIBRATION - GC

A. The GC standards were analyzed at the required frequency (every 72 hours at a minimum or per method).

Yes ____ No ____

B. The chromatographic resolution and separation criteria were met.

Yes ____ No ____

D. The suggested columns were used and the PQL's were met.

Yes ____ No ____

E. Calibration factors for ICAL met the method 20% RSD limit for 3 to 5 of the major Aroclor peaks, or the linear regression " r " > 0.99.

Yes ____ No ____

F. %D's for Continuing Calibration Factors and retention times (RT) were within the 15 %D (50% for closing CCV) limits.

Yes ____ No ____

IV. SURROGATE

A. Surrogate spikes were analyzed with every sample.

Yes ____ No ____

B. And met the recovery limits defined in the current contract or 30 – 130%. If recovery limits were exceeded, the sample was re-extracted and re-analyzed.

Yes ____ No ____

V. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ____ No ____

B. The MS and MSD percent recoveries were within the limits defined in the QAPP as 30 – 150%.

Yes ____ No ____

C. The MSD relative percent differences (RPD) were within the QAPP limits of 30% RPD.

Yes ____ No ____

D. The QC samples were client samples.

Yes ____ No ____

VI. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes ____ No ____

B. The LCS percent recoveries were within the limits defined in the QAPP of 50 – 150%.

Yes ____ No ____

VII. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ____ No ____

B. No blank contamination was found in the Method Blank.

Yes ____ No ____

C. If Equipment Rinse Blanks were identified, no blank contamination was found.

Yes ____ No ____ NA ____

VIII. FIELD QC

If Field duplicates or Performance Check Compounds were identified, they met the $\geq 50\%$ RPD ($\pm 4 \times \text{RL}$ for low level soil) or % recovery criteria for the project.

Yes ____ No ____ NA ____

IX. SYSTEM PERFORMANCE

A. The chromatograms and general system performance were acceptable for all instruments and analytical systems.

Yes ____ No ____ NA ____

B. The suggested EQL's for the sample matrices in this set were met

Yes ____ No ____ NA ____

XI. TCL COMPOUNDS

A. All raw data chromatograms and data system printouts were evaluated for a 10% of detected compounds and the identification is accurate.

Yes ____ No ____

B. Retention time limits or peak pattern identifications are met.

Yes ____ No ____ NA ____

XII. OVERALL ASSESSMENT OF THE CASE

DATA VALIDATION FORM FOR ORGANICS GC/MS

SDG NUMBER _____

PROJECT: _____

LABORATORY: Pace Analytical, Minneapolis, MN

SAMPLE MATRIX: Soil

SAMPLING DATE(S): _____

NO. OF SAMPLES: _____

ANALYSES REQUESTED: PAHs (SIM) and/or VOCs

SAMPLE NO. _____

DATA REVIEWER: _____

INITIALS/DATE: _____

QA REVIEWER: _____

Telephone Logs included Yes _____ No _____

Contractual Violations Yes _____ No _____

Comments:

I. DELIVERABLES

A. All deliverables were present as specified in the QAPP.

Yes ____ No ____

II. ANALYTICAL REPORT FORMS

A. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes ____ No ____

B. Holding Times

1. The required holding times were met for all analyses (Time of sample receipt to time of analysis (VOA) or extraction and from extraction to analysis).

Yes ____ No ____

C. Chains of Custody (COC)

1. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes ____ No ____

2. Samples were received at the required temperature and preservation.

Yes ____ No ____

III. INSTRUMENT CALIBRATION - GC/MS

A. Initial Calibration

1. The Response (RF) and Relative Response Factors (RRF) and average RRF for all compounds for all analyses met the contract criteria of 0.05 (EPA poor responders 0.01).

Yes ____ No ____ NA ____

2a. The relative standard deviation (RSD) for the five point calibration was within the 30% limit for the CCCs.

Yes ____ No ____ NA ____

2b. The average relative standard deviation (RSD) for all spiked compounds was less than 30% (40% Poor responders) for volatiles and 35% for SIM or correlation coefficients met the 0.990 limit.

Yes ____ No ____ NA ____

3. The 12 hour system Performance Check was performed as required in SW-846.

Yes ____ No ____ NA ____

B. Continuing Calibration

1. The RRF 50 standard was analyzed for each analysis at the required frequency and the QC criteria or 0.05 (poor responders 0.01) were met.

Yes ____ No ____ NA ____

2. The percent difference (%D) limits for the CCC's of $\pm 25\%$ (40% poor responders) were met.

Yes ☐ No ☐ NA ☐

IV. GC/MS INSTRUMENT PERFORMANCE CHECK

The BFB or DFTPP performance check was injected once at the beginning of each 12-hour period and relative abundance criteria for the ions were met.

Yes ☐ No ☐ NA ☐

The DFTPP tune is not applicable to selected ion monitoring since not all masses are monitored. The laboratory tune check demonstrates that the instrument meets full-scan criteria.

V. INTERNAL STANDARDS

The Internal Standards met the 100% upper and -50% lower limits criteria and the Retention times were within the required windows.

Yes ☐ No ☐ NA ☐

VI. SURROGATE

Surrogate spikes were analyzed with every sample.

Yes ☐ No ☐

And met the recovery limits defined in the QAPP of 50 – 130% for volatiles and 30 – 130% for SIM

Yes ☐ No ☐

VII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A. Matrix spike (MS) and matrix spike duplicates (MSD) were analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes ☐ No ☐

B. The MS and MSD percent recoveries were within the limits defined in the QAPP of 50 – 130% for volatiles and 30 - 150% for SIM.

Yes ☐ No ☐

C. The MSD relative percent differences (RPD) were within the QAPP limits of < 30% RPD.

Yes ☐ No ☐

Yes ☐ No ☐ NA ☐

VIII. LABORATORY CONTROL SAMPLE

A. A Laboratory Control Samples (LCS) was analyzed for every analysis performed and for every 20 samples.

Yes ☐ No ☐

B. The LCS percent recoveries were within the limits defined in the QAPP of 60 – 130% (40% poor responders) for volatiles and 40 – 130% for SIM.

Yes ☐ No ☐

IX. BLANKS

A. Method Blanks were analyzed at the required frequency and for each matrix and analysis.

Yes ☐ No ☐

B. No blank contamination was found in the Method Blank including a 10% raw data check for SIM contamination below the MDL.

Yes ☐ No ☐

C. If Equipment Rinsate Blanks were identified, no blank contamination was found.

Yes ☐ No ☐ NA ☐

X. FIELD QC

If Field duplicates or Performance Check Compounds were identified, they met the < 50% RPD ($\pm 4 \times \text{RL}$ for low level results) or % recovery criteria for the project.

Yes ☐ No ☐ NA ☐

XI. SYSTEM PERFORMANCE

A. The RICs, chromatograms, tunes and general system performance were acceptable for all instruments and analytical systems.

Yes ☐ No ☐ NA ☐

B. The suggested EQL's for the sample matrices in this set were met

Yes ☐ No ☐ NA ☐

XII. TCL COMPOUNDS

A. The identification is accurate and all retention times, library spectra and reconstructed ion chromatograms (RIC) were evaluated for all detected compounds.

Yes ☐ No ☐ NA ☐

B. Quantitation was checked to determine the accuracy of calculations for a representative compound in one internal standard quantitation set.

Yes ☐ No ☐ NA ☐

XIII. OVERALL ASSESSMENT OF THE CASE

Appendix E

Analytical Data Validation Forms

FIELD DATA VALIDATION FORM

Site/Event:	
Sample Collection Date(s):	
Matrix: Soil	
Field Sampler(s):	
Date Reviewed:	Reviewed By:

Item No.	Item/Question	QAPP Requirements Met (yes/no)? ⁽¹⁾
1	The sampler's training documentation on file?	
2	All required samples were collected?	
3	All required analyses/analytes were requested?	
4	Chain of Custody filled out in accordance with SOPs F-1, F-2 and F-3?	
5	Field notes/documentation cover the required elements in SOPs F-1, F-2 and F-3?	
6	Certificate of Analysis (bottle cleanliness) was obtained?	
7	Sampling methods followed SOPs F-1, F-2 and F-3?	
8	Equipment decontamination followed SOP F-4?	
9	Field duplicates (and ISM replicates) were collected at required frequency?	
10	Cooler was properly delivered to the laboratory?	
11	Sampling deviations/corrective action (if any) documented?	
12	Wenck's copy of Chain of Custody and other field documentation properly filed?	

(1) If the QAPP requirements were not met for any item, list the item number(s) below and provide additional explanation.

Item No.	Comments

Appendix F

Data Qualification Procedures and Data Qualifier Definitions

Data Qualifier Definitions

Data Validation Qualifiers: Organic Data

- J estimated
- IC# calibration accuracy, # = a) a whole number for initial %RSD of the response factors (RF) or continuing calibration % difference of RFs, or b) a decimal number for RFs or if it is a 0.99xx number it is the correlation coefficient of the initial calibration curve.
- JD# MS duplicate precision, # = RPD between sample and duplicate, use "J*" when +/- CRDL criteria is failed
- JH# holding time exceeded, # = number of days exceeding holding time
- JI# internal standard recovery, # = percent recovery of the internal standard area counts for the specific sample
- JL# laboratory control sample recovery, # = percent recovery of the LCS
- JN tentatively identified compound
- JP For two column GC work, this notes an RPD > 40% between values
- JMS# matrix spike recovery, # = percent recovery of the spike
- JS# surrogate spike recovery, # = percent recovery of the spike
- JT# temperature exceedence, where # is the degrees over 6
- R rejected data
- UB# blank contamination, # = highest concentration of blank affecting data
- UJ compound was not detected in the analysis; however, the associated detection limit may not be accurate or precise

Data Validation Qualifiers: Inorganic Data

- J estimated
- IC# calibration accuracy, # = percent recovery of the standard analyte or % RSD of ICPMS standards
- JD# duplicate precision, # = RPD between sample and MSD or duplicate, use "J*" when +/- CRDL criteria is failed
- JE# serial dilution interference, # = percent difference from undiluted value or note that the linear range has been exceeded
- JH# holding time exceeded, # = number of days exceeding holding time
- JII# ICP interference check sample, # = percent recovery of the ICS
- JIS# internal standard recovery, # = percent recovery of the internal standard area counts for the specific sample
- JK# negative blank results, # = value of the negative blank
- JL# laboratory control sample recovery, # = percent recovery of the LCS
- JMS# matrix spike recovery, # = percent recovery of the spike
- R rejected data
- UB# blank contamination, # = highest concentration of blank affecting data
- UJ compound was not detected in the analysis; however, the associated detection limit may not be accurate or precise

Data Qualifying Procedures for Volatile Organic Data GCMS

Data Qualification Procedure if Control Limits are Exceeded

Laboratory must state in the Case Narrative that calibration was performed in accordance with method-specified criteria and that all performance criteria for calibration were met. If any performance criteria are not met, the laboratory must discuss the excursions and the data review shall use professional judgment to determine the need for any data qualification. For data validation, the data qualification procedures described below should be followed.

If the holding time specified in QAPP Worksheet #19 is exceeded, quality results as estimated (USE). If the exceedance is more than two times the specified holding time, then non-detect results will be rejected.

The method allows the lower RF for poor responders if the detection limits are appropriately elevated to adjust for instrument sensitivity. If RF < 0.05 (or < 0.01 for poor responders): Quality all results < MDL as unusable (N). Quality all results > MDL as estimated (USE). Results may be biased low.

A correlation coefficient r^2 of > 0.99 is also acceptable for compounds with an RSD of > 30%. If RSD > 30% (or > 40% for poor responders): Quality all results > MDL as estimated (USE). Results < MDL are acceptable if the RF is within limits.

The method allows the lower RF for poor responders if the detection limits are appropriately elevated to adjust for instrument sensitivity. If RF < 0.05 (or < 0.01 for poor responders): Quality all results < MDL as unusable (N). Quality all results > MDL as estimated (USE). Results may be biased low.

If MD > 15% (or > 40% for poor responders): Quality all results > MDL as estimated (USE). Results < MDL are acceptable if the RF is within limits. If the response factor for either the LCA or CCAL are low, the RF qualifier takes precedence.

If an analyte other than acetone, methylene chloride, or MEK is detected in the method blank at > RL, then samples should have been reanalyzed. If acetone, methylene chloride, or MEK is detected in the method blank at > 5 x RL, then samples should have been reanalyzed.

If an analyte is detected in any type of blank but is not detected in any samples, then all results are acceptable. If an analyte is detected in any type of blank and is also detected in samples (at concentration(s) that are > 5 times the highest detection in a blank, for > 10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, MEK), then all results are acceptable.

If an analyte is detected in any type of blank and is also detected in samples (at concentration(s) that are < 5 times the highest detection in a blank, for < 10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, or phthalates), then qualify those results as undetected (USE), as deemed appropriate.

If the area counts are not within 50% to >100% of the daily standard area. Quality all results as estimated (USE).

If LCS % Recovery is > 130%: Quality results > MDL as estimated (USE). Results may be biased high. Results < MDL are acceptable. If LCS % Recovery is 30-59%: Quality all results as estimated (USE). Results may be biased low.

If LCS % Recovery is < 30%: Quality all results < MDL as unusable (N). Quality results > MDL as estimated (USE). Results may be biased low. If spike % Recovery is > 130% for more than 1 surrogate: Quality results > MDL as estimated (USE). Results may be biased high. Results < MDL are acceptable.

If spike % Recovery is 30-49% for more than 1 surrogate: Quality all results as estimated (USE). Results may be biased low. If spike % Recovery is < 30% for more than 1 surrogate: Quality all results < MDL as unusable (N). Quality results > MDL as estimated (USE). Results may be biased low.

If MS or MSD % Recovery is > 130%: Quality results > MDL as estimated (USE). Results may be biased high. Results < MDL are acceptable. If MS or MSD % Recovery is 30-49%: Quality all results as estimated (USE). Results may be biased low.

If MS or MSD % Recovery is < 30%: Quality all results < MDL as unusable (N). Quality results > MDL as estimated (USE). Results may be biased low. If the RPD for the MS vs MSD result is > 30%: Quality results as estimated (USE).

If MS % recovery is outside the 50 to 130% limits, but the original sample concentration is 4 (or more) times the spike concentration, all results are acceptable. The RPD must be met even if the original sample concentration is 4 (or more) times the spike concentration.

QC Parameter	Control Limit
Calibration (hardware tuning, response factors)	Per Method and project QAPP
Holding Time	(see Worksheet #19 of the QAPP)
Initial Calibration	Response Factors: RF > 0.05 (or > 0.01 for poor responders) RSD < 30% for < 40% for poor responders)
Continuing Calibration	RF 50 Standard: RF > 0.05 (or > 0.01 for poor responders) %D of 25% (or 40% for poor responders)
Blanks (Method, Trip, Equipment Rinse)	No Detections
Internal Standards	50 to >100%
Laboratory Control Sample	60 to 130% poor responders 40%
Surrogates (System Monitoring Compounds)	50 to 130%
Matrix Spike/Matrix Spike Duplicate	50 to 130% Rec. 30% RPD (% Rec does not apply if original sample conc. is 4 or more times spike conc.)

Data Qualifying Procedures for Volatile Organic Data GCMS (con't)

RPD of 50%
(unless sample
or duplicate is
≤ 5 times RL,
then use ± 4 x RL)

Field Duplicates
(and QA spikes)

If RPD is > 50% Quality all results as estimated (QAE)
If the ± 4 x RL criteria is exceeded Quality all results as estimated (QAE)

Data Qualifying Procedures for Air Volatile Organic Data GCMS TO-15

QC Parameter	Control Limits	Data Qualification Procedure if Control Limits are Exceeded
Calibration (hardware tuning, response factors)	Per Method and project QAPP	Laboratory must state in the Case Narrative that calibration was performed in accordance with method-specified criteria and that all performance criteria for calibration were met. If any performance criteria are not met, the laboratory must discuss the excursions and the data reviewer shall use professional judgement to determine the need for any data qualification. For data validation, the data qualification procedures described below should be followed.
Holding Time	(see Worksheet #19 of the QAPP)	If the holding time specified in QAPP Worksheet #19 is exceeded, quality results as estimated (JHE). If the exceedance is more than two times the specified holding time, then non-detect results will be rejected.
Canister Pressure	Per sample SOP	Check initial and final pressures to ensure no leakage
Initial Calibration	Response Factors: RF > 0.05 RSD < 30% (or < 40% for poor responders)	The method allows the lower RF for poor responders if the detection limits are appropriately elevated to adjust for instrument sensitivity. If RF < 0.05: Quality all results < MDL as unusable (R). Quality all results > MDL as estimated (JCH). Results may be biased low. A correlation coefficient "r" of > 0.99 is also acceptable for compounds with an RSD of > 20%. If RSD > 30% (or > 40% for poor responders): Quality all results > MDL as estimated (JCH). Results < MDL are acceptable if the RF is within limits.
Continuing Calibration	RRF 50 Standard: RF > 0.05 %D of 25% (or 40% for poor responders)	The method allows the lower RF for poor responders if the detection limits are appropriately elevated to adjust for instrument sensitivity. If RF < 0.05: Quality all results < MDL as unusable (R). Quality all results > MDL as estimated (JCH). Results may be biased low. If %D > 25% (or > 40% for poor responders): Quality all results > MDL as estimated (JCH). Results < MDL are acceptable if the RF is within limits. If the response factors for either the ICAL or CCAL are low, the RF qualifier takes precedence.
Method Blanks	No Detections	If an analyte other than acetone, methylene chloride, or MEK is detected in the method blank at > RL, then samples should have been reanalyzed. If acetone, methylene chloride, or MEK is detected in the method blank at > 5 x RL, then samples should have been reanalyzed. If an analyte is detected in any type of blank but is not detected in any samples, then all results are acceptable. If an analyte is detected in any type of blank and is also detected in sample(s) at concentration(s) that are > 5 times the highest detection in a blank, (or > 10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, or phthalates), then all results are acceptable. If an analyte is detected in any type of blank and is also detected in sample(s) at concentration(s) that are < 5 times the highest detection in a blank, (or < 10 times for common laboratory contaminants such as acetone, 2-butanone, methylene chloride, or phthalates), then qualify those results as undetected (UD#), as deemed appropriate.
Internal Standards	50 to < 100%	If the area counts are not within 50% to < 100% of the daily standard area: Quality all results as estimated (JHE).
Laboratory Control Sample	60 to 130% poor responders 40%	If LCS % Recovery is > 130%: Quality results > MDL as estimated (JHE). Results may be biased high. Results < MDL are acceptable. If LCS % Recovery is 30-59%: Quality all results as estimated (JHE). Results may be biased low. If LCS % Recovery is < 30%: Quality all results < MDL as unusable (R). Quality results > MDL as estimated (JHE). Results may be biased low.
Surrogates (System Monitoring Compounds)	50 to 130%	If spike % Recovery is > 130% for more than 1 surrogate: Quality results > MDL as estimated (JSE). Results may be biased high. Results < MDL are acceptable. If spike % Recovery is 30-49% for more than 1 surrogate: Quality all results as estimated (JSE). Results may be biased low. If spike % Recovery is < 30% for more than 1 surrogate: Quality all results < MDL as unusable (R). Quality results > MDL as estimated (JSE). Results may be biased low.
Matrix Duplicate	30 RPD (unless sample or duplicate is < 5 times RL, then use < 2 x RL)	If RPD is > 30%: Quality all results as estimated (JDE). If the < 4 x RL criteria is exceeded: Quality all results as estimated (J*#) Note there is no matrix spike for air canisters
Field Duplicates (and QA splits)	RPD of 50%, (unless sample or duplicate is < 5 times RL, then use < 4 x RL)	If RPD is > 50%: Quality all results as estimated (JDE). If the < 4 x RL criteria is exceeded: Quality all results as estimated (J*#)

Vapor Intrusion Study for Off-Site Plumes at Ft. Gillem

1.0 INTRODUCTION

24 JULY 2013

1030-1230

FORT MCPHERSON, BLDG. 65

1.1 PURPOSE: Army
1.2 SCOPE: Preliminary Scoping Meeting for Vapor Intrusion Study
1.3 LOCATION: Owen Nuttall
1.4 ATTENDEES: Heather Hawkins (Wenck)
1.5 FACILITATOR: Heather Hawkins (Wenck)
1.6 AGENDA: Owen Nuttall (Army), Tracey Epperley (USACE), Steven Bath (USACE), Heather Hawkins (Wenck), Joe Otte (Wenck), Shane Waterman (Wenck), Mike Monteleone (Oasis-FPILRA), Adam Hayes (Oasis-FPILRA), Amy Potter (GA EPD), Mary Brown (GA EPD), Jessica Turner (GA EPD)

Agenda topics

VAPOR INTRUSION (VI) STUDY FOR OFF-SITE PLUMES

Owen Nuttall began the meeting by introducing Wenck as the contractor that would perform the VI Study. The meeting was then opened up for discussion and questions. Joe Otte asked if GA EPD had any established indoor air quality screening values. GA EPD stated that they did not have any screening values. GA EPD stated that they rely heavily on Region IV EPA to provide guidance on VI issues and that Ben Bentkowski of EPA is the technical expert for the region. Bentkowski had already looked at the Fort Gillem site, specifically the off-site plumes at FTG-09. Based on the past investigations he evaluated, Bentkowski drafted a memo recommending a site specific evaluation of the off-site areas for vapor intrusion. GA EPD stated that EPA recommended that the Army should start at Step 3 of the evaluation process.

Wenck stated that an initial step would be to identify the receptors that would complete the pathway for vapor intrusion related to the contamination at Gillem. One approach that had been used frequently in EPA Region V was to only look at homes with basements as potential receptors. Amy Potter stated that she did not believe EPA Region IV would agree to the approach.

Wenck suggested screening the soil at the fence line by taking soil/gas samples at a depth of 6-8 feet. Wenck stated that this would be a way to evaluate where potential hot spots would be beyond the fence line. GA EPD did not agree with the approach saying that it would be difficult to correlate soil/gas sample data with data that would be collected under a slab.

DISCUSSION

The group discussed preemptive mitigation measures for receptors with the highest risk to be impacted by Vapor Intrusion. GA EPD stated that they would defer to EPA Region IV.

Army, Wenck, and GA EPD discussed how to address VOCs that would be captured by indoor air sampling that could be attributed to household products, etc. GA EPD said that the compounds analyzed in indoor air quality samples should be limited to the contaminants of concern (COCs). COCs on the south side of Fort Gillem are more condensed compared to the COCs at FTG-01. GA EPD would provide a list of COCs for the north and south sides that should be used. GA EPD stated that Wenck should use the latest Draft EPA guidance for VI studies which called for using "multiple lines of evidence" for assessing human health risks due to vapor intrusion.

Army, Wenck, and GA EPD discussed timing of the VI Study based on the current remedial investigation (RI) at FTG-01, 07/10, and 09. Off-site sampling has been delayed due to access issues. GA EPD stated that the data set from the 2008 RI (Shaw), as well as the performance monitoring reports for the GWETS at FTG-01 and-09, provide enough data to start the VI study.

Mary Brown asked about an off-site study in conjunction with FTG-02. To date, an off-site plume related to FTG-02 has not been identified. Any discussions of a VI Study for off-site areas adjacent to FTG-02 would be addressed after Aerostar finishes their investigation.

GA EPD defers to EPA Region IV (Ben Bentkowski) for specific guidance on scoping the VI study and/or VI mitigation at Fort Gillem.

GA EPD to provide a list of COCs to sample for indoor air quality on the north and south sides of Fort Gillem.

GA EPD

GA EPD requests that the foot prints of houses be included on any maps related to sampling done in conjunction with the VI Study

Army/Wenck

NA

UNCLASSIFIED

CONFIDENTIAL FOR DISSEM

CONFIDENTIAL FOR DISSEM

Meeting with USACE, GA EPA, and Wenck scheduled for 1330, 24 July 2013

Vapor Intrusion Study for Off-Site Plumes at Ft. Gillem

MINUTES

24 JULY 2013

1330-1530

SAM NUNN ATLANTA FEDERAL CENTER,
EPA REGION IV

HOST ORGANIZATION: U.S. Army Corps of Engineers, Savannah District (USACE)
MEETING PURPOSE: Meeting with EPA Region IV seeking guidance for Vapor Intrusion Study at Fort Gillem
MEETING LOCATION: Cathy Amoroso
MEETING DATE: Heather Hawkins (Wenck)
MEETING TIME: Heather Hawkins (Wenck)
ATTENDEES: Tracey Epperley (USACE), Steven Bath (USACE), Heather Hawkins (Wenck), Amy Potter (GA EPD), Jessica Turner (GA EPD), Cathy Amoroso (EPA), Ben Bentkowski (EPA)

Agenda topics

VAPOR INTRUSION (VI) STUDY FOR OFF-SITE PLUMES AT FORT GILLEM

Ben Bentkowski (EPA Region IV VI Coordinator) opened the meeting by identifying reference materials that EPA recommends the Army use as a guide for scoping the VI study at Fort Gillem.

All technical documents related to vapor intrusion including information on screening values and natural attenuation can be found at: <http://www.epa.gov/oswer/vaporintrusion/>.

Cathy Amoroso stated that GA EPD is still the lead regulatory agency for Fort Gillem and the EPA is willing to assist where they can.

Ben recommended using the DoD Vapor Intrusion Handbook (January 2009) as the guidance for scoping the VI study. The guidance calls for two rounds of sampling (in different seasons). The data set from each house would include indoor air sampling via summa canister positioned in a central location, a sub slab/crawl space/basement grab sample taken in a central location, and an outdoor air sample. One outdoor sample can be used for multiple homes that are in the same general vicinity.

Grab samples to be collected with 6L summa canisters over a 24 hour period. First round of samples should be analyzed for the full VOC suite. Second round of samples can be analyzed for specific contaminants of concern.

DISCUSSION

Bentkowski had already looked at the Fort Gillem site, specifically the off-site plumes at FTG-09. Data evaluated included the 2008 Remedial Investigation Report and a Performance Monitoring Report from December 2012. Based on the past investigations, Bentkowski drafted a memo recommending a site specific evaluation of the off-site areas for vapor intrusion. Ben stated that based on existing data, the potential for VI exposure for off-site residences exists. EPA recommends that the Army should start at Step 3 of the evaluation process.

Wenck suggested screening the soil at the fence line by taking soil/gas samples. Wenck stated that this would be a way to evaluate where potential hot spots would be beyond the fence line. EPA stated that it is difficult to correlate soil/gas sample data with data that would be collected under a slab.

Preemptive mitigation measures for receptors with the highest risk was discussed. Ben stated that EPA Region IV had never used or recommended that approach; however, they would be open to it if it made sense.

Criteria to be used for selecting homes to be sampled was discussed. GA EPD stated that there are not many shallow wells that would identify hot spots in the shallow aquifer off-site. An option would be to install shallow wells and take geoprobe samples to identify hot spots. Another option would be to use existing data and target homes where hot spots have been identified in the plume and areas where there is shallow groundwater.

Involving the community is a high priority of GA EPD and EPA. EPA suggested developing a Community Involvement Plan. Components of the plan should include: the distribution of facts sheets about the

investigation to the community, visits to targeted homes, public meetings, etc. USACE suggested informal public meetings with information booths. Fact Sheets, flyers, public meetings, etc. should take place before the investigation.

Cathy Amoroso noted that some houses along the fence line may be impacted by both vapor intrusion and surface water coming off the installation at outfalls; therefore, fact sheets and other correspondence with the homeowner should address both issues.

EPD asked if EPA could assist with the review of documents related to the VI Study. EPA agreed to help. EPD to send request to Cathy's supervisor.

EPA Region IV (Ben Bentkowski) recommends using DoD Vapor Intrusion Handbook (January 2009). Use current data to begin scoping VI study. Prior to the investigation, EPA recommends developing and implementing a Community Involvement Plan.

ACTION ITEMS

PERSON RESPONSIBLE

DATE

Cathy Amoroso/Ben Bentkowski to forward Memo to USACE and the Army

EPA

NA

GA EPD to request Ben review documents related to study.

GA EPD

NA

APPROVED

RESOURCE PROVIDED

SPECIAL NOTES

1.16.2014		1000 - 1200	Fort McPherson
Meeting called by	Tracey Epperley, USACE		
Type of meeting	Fort Gillem Vapor Intrusion Study Kick-Off Meeting		
Facilitator	Mike Coats, HCR		
Note taker	Amelia Gull, Wenck		
Attendees	Present: Steve Bath (USACE), Mike Coats (HCR), Tracey Epperley (USACE), Amelia Gull (Wenck), Heather Hawkins (Wenck), Jason Lennane (USACE), Tara McCullen (Wenck), Owen Nuttall (Army) Conference Call: Christine Mayo (Wenck), Jordan Shuck (Wenck)		
	Mike Coats (HCR)		
Discussion	Tasks 1 - 8		
Task 1: Vapor Intrusion Work Plan, SSHP and APP -The Work Plan will be submitted to the Army and COE from Wenck. The Army will submit the reports to the GA EPD and EPA. The APP and SSHP will be submitted to the COE from Wenck. -Wenck requested that the PM be authorized to sign the SSHP/APP. The USACE COR said that was ok. The Draft Plans must be signed before submitting to COE. -Wenck will submit a printed copy of the DRAFT APP and SSHP to the COE as requested by the COE. -Wenck will continue working without the approved APP and SSHP until field work begins. At this point, the approved APP and SSHP has to be on site. -Wenck will work on the work plan and the APP and SSHP concurrently and the schedule will be based on approval of documents. -Wenck will provide a report for each site separately (FTG01, FTG07/10, and FTG09). -Wenck will update the schedule (calendar) in the Master Schedule. Wenck will submit the DRAFT WP to the Army and COE on 3 March.			
Task 2: Community Involvement Plan Implementation -Wenck will provide two fact sheets. The first one is for the surrounding residential areas of the Installation. The second one will be sent to residents directly involved with the work. -Wenck is locating a facility for the public meeting. Forest Park LRA may allow use of Forest Park City Hall. The COE suggest using a return card to determine interest in information or meetings. Press is allowed. -The Army and COE will have 14 days to review the Fact Sheets. -Wenck will need CIP approved by GA EPD and EPA before the Fact Sheets can be mailed. -Wenck is requesting consolidated comments on documents being reviewed by GA EPD, EPA, Army, and COE. -Wenck will mail Fact Sheet 2 prior to the sampling events. -Analytical results will be submitted to the homeowners individually.			
Task 3: Inventory of Potential Receptors -Inventory of potential receptors, development of GIS inventory of permanent improvement and known utilities within the known boundaries of the groundwater plumes. Wenck will have separate files for each of the plumes. The Inventory will identify construction type, crawlspace, slab, or basement for residential dwellings or commercial structures to include ground surface elevation, HVAC unit type, and whether or not the facility is occupied. The GIS inventory will also incorporate surface topography, well locations, location and depth of utilities. -If there are issues getting requested information from Clayton County, the Army may be able to work through the Forest Park LRA to obtain the information.			
Task 4: Well Installation and Groundwater Sampling -Up to 15 wells will be included in the well installation and groundwater sampling. -Wenck will propose the location of the wells in the WP. -Existing wells will be utilized. Wenck is identifying off-site well locations. COE advises to use historic information but do not concentrate on groundwater results only. Choose well locations so that sample results can be used to be able to draw conclusions from indoor air sampling results in the VI Study.			

1.18.2014			1000 - 1200			Fort McPherson		
<p>Task 5: Installation and Sampling of Off-Site Soil Gas Probes</p> <ul style="list-style-type: none"> -Wenck will install one shallow and one deep soil/gas probe -One soil/gas probe sampling event will be conducted. -There will be 40 vapor implants. -All field work will include two person teams. 								
<p>Task 6: Identify Buildings of Interest</p> <ul style="list-style-type: none"> -The Army and COE will have 14 days to review the buildings of interest list. -Map with GIS data for review and include the depth of groundwater from surface. 								
<p>Task 7: Sub-slab, Indoor Air, and Background Air Sampling</p> <ul style="list-style-type: none"> -Approximately 50 houses. Initially. -Summer/Fall will be the best sampling event choices. -First event needs to be completed before August but is based on review time of documents. -To get in the field earlier, we could submit the WP and SSHP and APP and notify residents in the first Fact Sheet of the upcoming sampling data set. Meet with GA EPD and EPA to request the okay to complete first sampling 100 yards around area without approved CIP. -Shane Waterman and/or Joe Otte will need to attend the meeting with EPA and GA EPD. -Wenck will modify schedule to reflect the discussed approach. 								
Action Items						Person Responsible		Deadline
Meeting with EPA and GA EPD on 11 or 12 February						ARMY/USACE		ASAP
<p>Mike Coats (HCR)</p>								
Discussion								
<ul style="list-style-type: none"> -HCR/Wenck schedule is 2.5 years. The contract period of performance is for 2 years. USACE suggested a no-cost mod based on the updated schedule. -Using template from FTMP-14 for the WP for formatting. -Christine Mayo (Wenck) is working on the format for the VIWP. 								
Action Items						Person Responsible		Deadline
<p>Tracey Epperley (USACE)</p>								
Discussion								
<ul style="list-style-type: none"> -Include all certificates for field guys in the SSHP. -Make sure this includes the construction worker 30 hour. -HCR and Wenck have 8-hour Supervisor. -Uniform Federal Policy for Quality Assurance Project Plans (UFP QAPP 37) is a work sheet type of plan that the Army is using currently for their WP. May consider for future documents. 								
Action Items						Person Responsible		Deadline

2.11.2014		1000 - 1200	Fort McPherson
Meeting called by	Owen Nuttall, BEC, Site Manager		
Type of meeting	Discussion		
Facilitator	Owen Nuttall		
Note taker	Amelia Guill		
Timekeeper	NA		
Attendees	Cathy Amorosa, EPA; Steve Bath, USACE; Ben Bentkowski, EPA; Mike Coats, HCR; Tracey Epperley, USACE; Amelia Guill, Wenck; Heather Hawkins, Wenck; Jason Lennane, USACE; Mike Monteleone, Oasis; Owen Nuttall, BRAC; Joe Otte, Wenck; Amy Potter, EPD; Jessica Turner, EPD; Shane Waterman, Wenck		
Discussion			

- Wenck/HCR schedule is set so that as much work can be completed before the field work begins.
- Wenck/HCR first field event will be groundwater sampling and soil gas sampling and is proposed to start in May or June.
- Wenck/HCR will begin indoor air sampling for VI Study in July.
- Wenck/HCR first subset of homes is within 100 yards of the installation in the plume area. A figure of the area to be sampled will be included in the work plan.
- Wenck/HCR will use the data from the summer event to add additional homes. The winter event will include the first set of homes plus the additional homes.

Discussion	
<ul style="list-style-type: none"> - Wenck will meet with residents to educate them about the sampling process, the compounds associated with the study, and compounds that are household related that may show up in the data. - Wenck will create a website and call center for residents to use if there are questions or concerns. - Wenck will disclose the information to the residents although there may be some compounds that are not directly related to the study. - GA EPD is concerned that there is an additive effect and although there are compounds in the home that are not contaminant related, once you add the contaminant related compounds to the ones that are ambient in the homes that might pose a risk that might otherwise not be there. - EPA suggests partnering with the local health department to assist with explaining the risks associated with household compounds and their own personal health issues. - EPA is concerned about when to release the data. The data needs to be defensible. - Wenck will conduct an internal review of the data and have it validated. - Army will keep the local government officials informed of findings and involve them in the community meetings. - Army will provide everyone with a weekly update of the work ongoing. 	

Discussion	
<ul style="list-style-type: none"> - Wenck will identify homes in the study area. - GA EPD suggests analyzing the surface water as well. - First sample set, summer/winter, will be within 100 yards of the fence line of the installation within the plume area. The second sample set, winter/summer, will be homes in the study area over the plume that through risk assessments and multiple lines of evidence suggests sampling needs to be done. - Wenck has not determined how many groundwater wells will be necessary. It is estimated there will be 15 wells added to the existing groundwater wells but this will be based on findings. These wells are to assess the location of the shallow plume. - Wenck will also install soil gas probes for another line of evidence. GA EPD does not require this because it is not reliable. EPA believes this needs to be done to support the multiple lines of evidence. - EPA says the different means of sampling are to create the multiple lines of evidence. Taking samples in and around the houses are for determining risks. The other samples are to find areas of concern and create multiple lines of evidence to better understand the groundwater and soil water concentration all around the installation. The contractor can then use this information to determine the most likely residences that are greatest risk. 	

- GA EPD recommends the sampling events be extended to 100 feet on each side of streams in the areas.
- Wenck will add the daycare on Forest Parkway to the sampling.
- Army emphasizes everything will be sampled and addressed. It has to be done in sets because of the broad study area.
- EPA suggests sampling some of the springs in the local area that has been included in the 1996 USACE Well Survey.
- USACE confirms the contractors are not limiting study to 100 yards.
- Wenck is in the process of getting the tax parcel data from Clayton County.
- Wenck is assuming there are approximately 50 homes in the first sample set and 150 homes total between the three sampling events.
- Wenck needs two sub-slab/crawlspace and one indoor air sample per home based on recommendations from EPA.
- Additionally, there will be one background sample per 4 to 5 homes as recommended by EPA.
- Army confirms the budget can be adjusted and funding is available if there are more participants than anticipated.

Discussion

- EPA prefers a conceptual site model with a cross section be included in the work plan.
- Fact Sheets will be reviewed by DOD Public Affairs, DOD lawyers, Pentagon.
- Fact Sheets will be included in the Community Involvement Plan so that they can be reviewed by GA EPD and EPA.
- There will be two fact sheets--Fact Sheet 1 will be general information and will be sent to the whole community; Fact Sheet 2 will contain information about the study and the process involved and will focus on the residents of interest.
- GA EPD suggested Wenck/HCR do any drilling after hours and work with the owners of the daycare facility. The only communication with parents would be if something is found during the study.
- USACE/Wenck/HCR will use the data from the RI.
- Oasis suggests having someone on site to answer questions/concerns
- EPA suggests giving the work plan to the Clayton County Health Department and have them involved. It is also suggested to partner with local government officials so everyone is aware of what is occurring and any issues that may arise.
- Army confirms this study does not include anything in the Gillem Enclave.

Appendix C

Atlas Geo-Sampling Helium Leak Test Procedures

REDACTED

APPENDIX D
SET 1 BUILDINGS OF INTEREST
FORT GILLEM VI STUDY

Map ID	TAXPAYERNA	STREETNO	STREETNAME	CITY	ZIPCODE	EXISTINGLA	X	Y	PN
FTG-01									
101			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243590.867	33.628526	12209B E018
102			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243592.204	33.62878	12209B E017
103			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243593.326	33.628993	12209B E016
104			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243594.414	33.629199	12209B E015
105			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243595.501	33.629405	12209B E014
106			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243596.588	33.629611	12209B E013
107			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243597.676	33.629817	12209B E012
108			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243598.763	33.630023	12209B E011
109			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243599.85	33.63023	12209B E010
110			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243600.937	33.630436	12209B E009
111			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243602.062	33.630649	12209B E008
112			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243603.184	33.630862	12209B E007
113			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243604.271	33.631068	12209B E006
114			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243605.359	33.631274	12209B E005
115			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243606.446	33.63148	12209B E004
116			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243607.473	33.631689	12209B E003
117			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243608.638	33.631933	12209B E002
118			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243638.453	33.632097	12209B E001
119			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243726.332	33.632086	12239C A052
120			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243801.306	33.632082	12239C A051
121			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243876.295	33.632079	12239C A050
122			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2243951.284	33.632075	12239C A049
123			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2244026.273	33.632072	12239C A048
124			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2244108.052	33.632066	12239C A047
125			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2244220.795	33.632063	12239C A046
126			RYAN RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2244309.928	33.632143	12239C A045
127			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245247.672	33.632029	12239C A002
128			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245322.664	33.632026	12239C A001
129			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245397.657	33.632024	12239D B029
130			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245472.649	33.632021	12239D B028
131			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245547.641	33.632018	12239D B027
132			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245622.633	33.632016	12239D B026
133			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245697.625	33.632013	12239D B025
134			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245772.617	33.63201	12239D B024
135			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245850.533	33.632005	12239D B023
136			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245943.702	33.632008	12239D B022
137			MALLARD CIR	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246035.919	33.632052	12239D B021
138			SLATE RD	ELLENWOOD	30294	UTILITY/PUBLIC USE	2246870.477	33.632538	12238C B001
139			SLATE RD	ELLENWOOD	30294	SINGLE FAMILY RESIDENTIAL	2247321.983	33.631983	12238C B007
140			FALCON CT	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246413.954	33.634595	12239D D020
141			FALCON CT	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246471.682	33.634769	12239D D021

Exemption 6 Personal Privacy

APPENDIX D SET 1 BUILDINGS OF INTEREST FORT GILLEM VI STUDY

Map ID	TAXPAYERNA	STREETNO	STREETNAME	CITY	ZIPCODE	EXISTINGLA	X	Y	FW
142			FALCON CT	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246564.827	33.634878	12239D D022
143			FALCON CT	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246640.205	33.635046	12239D D023
144			SLATE RD	ELLENWOOD	30294	UTILITY/PUBLIC USE	2246870.477	33.632538	12238C B001
145			SLATE RD	ELLENWOOD	30294	SINGLE FAMILY RESIDENTIAL	2247321.383	33.631983	12238C B007
146			SLATE RD	ELLENWOOD	30294	SINGLE FAMILY RESIDENTIAL	2247357.29	33.632606	12238C A011
147			SLATE RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245842.458	33.633103	12239D C023
148			SLATE RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2245917.754	33.633151	12239D C022
149			SLATE RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246004.513	33.63318	12239D C021
150			SLATE RD	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246211.845	33.633193	12239D B016
151			FALCON CT	CONLEY	30288	SINGLE FAMILY RESIDENTIAL	2246657.103	33.634345	12239D A001
FTG-07/10									
701			5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249916.453	33.615419	12180A F015
702			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2250537.909	33.614901	12180A F019
703			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2250552.299	33.615553	12180A F042
704			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2250652.307	33.615551	12180A F043
705			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2250802.3	33.615548	12180A F044
706			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251002.316	33.615544	12180A F045
707			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251227.32	33.615539	12180A F046
708			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2250945.358	33.614773	12180A F032
709			1ST AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251097.395	33.614972	12180A F036
710			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251043.478	33.614567	12180A F033
711			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251143.446	33.614561	12180A F034
712			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251245.326	33.614761	12180A F035
713			6TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251375.085	33.614773	12180B B001
714			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251141.937	33.614138	12180A F047
715			2ND AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2251287.957	33.614049	12180A F031
FTG-09									
901			1ST ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248782.467	33.615752	12179B E001
902			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248932.423	33.615742	12179B E021
903			3RD ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249258.041	33.615634	12179B F021
904			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248931.01	33.615507	12179B E020
905			1ST ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248779.319	33.615228	12179B E003
906			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248929.275	33.615218	12179B E018
907			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249106.415	33.614828	12179B F005
908			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249105.058	33.614539	12179B F007
909			4TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249582.985	33.614134	12180A E003
910			COOK RD	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249512.789	33.612748	12180A C003
911			COOK RD	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249449.102	33.61126	12179D D005A
912			FOREST PKWY	MORROW	30260	COMMERCIAL	2250324.705	33.610041	12180C F047
913			1ST ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248777.254	33.614885	12179B E005
914			3RD AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2248846.398	33.613964	12179B E011
915			2ND ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249102.236	33.613962	12179B F010

Exemption 6 Personal Privacy

APPENDIX D
SET 1 BUILDINGS OF INTEREST
FORT GILLEM VI STUDY

Map ID	TAXPAYERNA	STREETNO	STREETNAME	CITY	ZIPCODE	EXISTINGLA	X	Y	PIN
916	[REDACTED]	[REDACTED]	3RD ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249252.523	33.61395	121798 F014
917	[REDACTED]	[REDACTED]	4TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249763.998	33.614511	12180A F005
918	[REDACTED]	[REDACTED]	5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249913.726	33.614409	12180A F012
919	[REDACTED]	[REDACTED]	4TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249762.71	33.61403	12180A F007
920	[REDACTED]	[REDACTED]	5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249909.372	33.614033	12180A F010
921	[REDACTED]	[REDACTED]	4TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249761.82	33.613742	12180A F008
922	[REDACTED]	[REDACTED]	5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249912.717	33.613752	12180A F009
923	[REDACTED]	[REDACTED]	5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249853.4	33.613159	12180A B004
924	[REDACTED]	[REDACTED]	4TH AVE	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249737.232	33.612765	12180A B007
925	[REDACTED]	[REDACTED]	5TH ST	MORROW	30260	SINGLE FAMILY RESIDENTIAL	2249908.377	33.612682	12180A B002

EPA Regional Screening Levels
May 2014

Analyte	USEPA Residential Air Risk Screening Level (RSL)*
1,1,1-Trichloroethane	5200
1,1,2,2-Tetrachloroethane	0.048
1,1,2-Trichloroethane	0.18
1,1-Dichloroethane	1.8
1,1-Dichloroethene	210
1,2,4-Trichlorobenzene	2.1
1,2,4-Trimethylbenzene	7.3
1,2-Dibromoethane	0.0047
1,2-Dichlorobenzene	210
1,2-Dichloroethane	0.11
1,2-Dichloroethylene, Total	---
1,2-Dichloropropane	0.28
1,2-Dichlorotetrafluoroethane	---
1,3,5-Trimethylbenzene	---
1,3-Butadiene	0.094
1,3-Dichlorobenzene	---
1,4-Dichlorobenzene	0.26
1,4-Dioxane	0.56
2,2,4-Trimethylpentane	---
2-Chlorotoluene	---
3-Chloropropene	0.47
4-Ethyltoluene	---
4-Isopropyltoluene	---
Acetone	32000
Benzene	0.36
Benzyl chloride	0.057
Bromodichloromethane	0.076
Bromoethene (Vinyl Bromide)	0.088
Bromoform	2.6
Bromomethane	5.2
Carbon disulfide	730
Carbon tetrachloride	0.47
Chlorobenzene	52
Chlorodifluoromethane (Freon 22)	52000
Chloroethane	10000
Chloroform	0.12
Chloromethane	94
cis-1,2-Dichloroethylene	---
cis-1,3-Dichloropropene	---
Cumene	420
Cyclohexane	6300
Dibromochloromethane	0.1
Dichlorodifluoromethane	100
Ethylbenzene	1.1
Freon TF	31000
Hexachlorobutadiene	0.13
Isopropyl alcohol	7300
m,p-Xylene	100
Methyl Butyl Ketone (2-Hexanone)	31
Methyl Ethyl Ketone	5200
methyl isobutyl ketone	3100
Methyl methacrylate	730
Methyl tert-butyl ether	11

Appendix F

Fort Gillem VI Study Fact Sheets, Right of Entry Form, and USEPA's Occupied Dwelling Questionnaire

U.S. Army

Fort Gillem

Forest Park, Clayton County, Georgia

Vapor Intrusion Study

FACT SHEET 1

Summer 2014

INTRODUCTION

This fact sheet provides information on the Vapor Intrusion Study being conducted for some homes and businesses in the Fort Gillem area.

LOCATION

Fort Gillem is located about ten miles south-east of Atlanta in Forest Park, Georgia. Fort Gillem is approximately 1,427 acres and is in a mixed-use residential and commercial neighborhood.

HISTORY

Fort Gillem began operations in 1942. During its operation, it was a center for the storage, distribution, maintenance, and disposal of military equipment and supplies.

Effective September 15, 2011, Fort Gillem became inactive, except for 257 acres, which is now the Fort Gillem Enclave (under command of Fort Gordon). Fort Gordon is conducting their own Vapor Intrusion Study for the Enclave. Plans for redevelopment and reuse of Fort Gillem are currently underway.

AREAS OF INTEREST

Since 1979, the Army has conducted many environmental investigations and environmental clean-up actions at Fort Gillem. These studies determined three contaminated sites have impacted the environment around Fort Gillem. For the purposes of this Vapor Intrusion Study, the following sites are the primary concern.

The first site is FTG-01 or the North Landfill Area (NLA). FTG-01 is in the northern portion of Fort Gillem. The second site, FTG-07/10, is located in the south/southeast portion of Fort Gillem. The third site, FTG-09, is also located in the southern portion of Fort Gillem. Individual environmental investigations occurred at each site through different sampling methods including soil sampling, groundwater sampling, and soil gas screenings. These investigations have shown that contamination has moved beyond the Fort Gillem boundary from these three sites.

A map of these sites can be seen on Figures 1 and 2.

Figure 1: Northern VI Study Area FTG-01 (North Landfill Area)

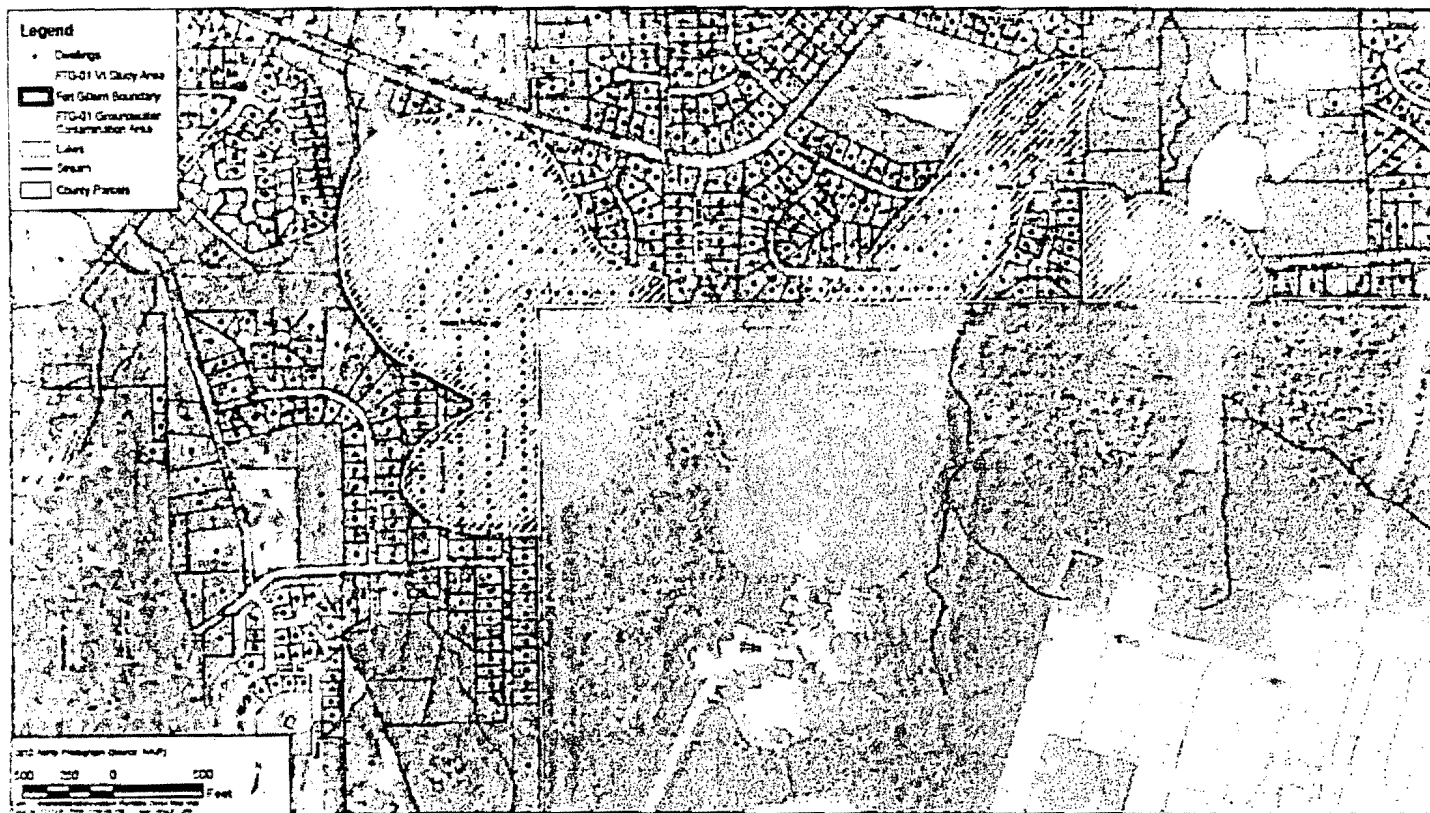
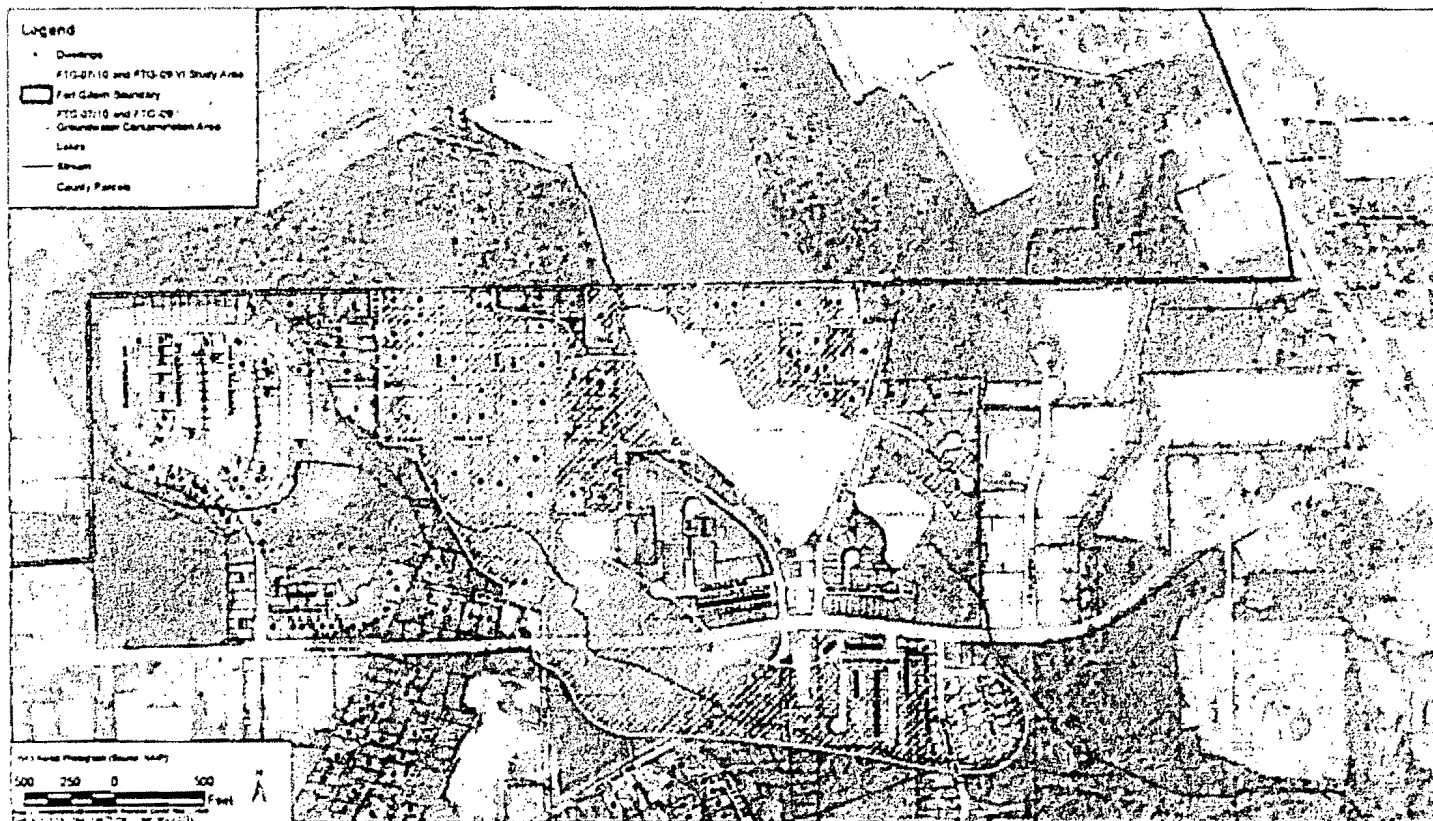


Figure 2: Southern VI Study Areas FTG-07/10 & FTG-09



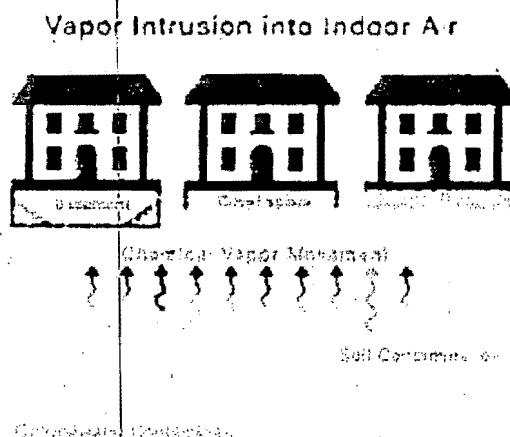


What You Should Know About Vapor Intrusion

The ARMY has developed this fact sheet to answer some of the most commonly asked questions about an important health issue called vapor intrusion. Vapors and gases from contaminated groundwater and soil have the potential to seep into indoor spaces and cause health problems.

What is vapor intrusion?

When chemicals or petroleum products are spilled or leak underground, they can give off gases or vapors that can get inside buildings. Common products that can cause vapor intrusion are gasoline or diesel fuel, dry cleaning solvents and industrial degreasers. The vapors move through the soil and seep through cracks in basements, foundations, sewer lines and other openings. Vapors can buildup and risk the health of residents or workers in those buildings. Some vapors such as those associated with these products are odor-free.



Can vapors in my home come from household sources?

Common household products can be a source of indoor air problems. Vapors and gases can come from: paints; paint strippers or thinners; moth balls; new carpeting and furniture; stored fuel; air fresheners; cleaning products; dry cleaned clothing and even cigarette smoke.

What are the health concerns related to vapor intrusion?

When vapor intrusion does occur, the health risk will vary based on the type of chemicals, the levels of the chemical found, the length of exposure and the health of exposed individuals. Some people may experience eye and respiratory irritation, headaches and/or nausea. These symptoms are temporary and should go away when the vapors are addressed. Low-level chemical exposures over many years may raise the lifetime risk of cancer or chronic disease.

What can I do to improve indoor air quality?

- Don't buy more chemicals than you need.
- Store unused chemicals in appropriate tightly-sealed containers.
- Don't make your home too air tight. Fresh air helps prevent chemical build-up and mold growth.
- Fix all leaks promptly, as well as other moisture problems that encourage mold.
- Check all appliances and fireplaces annually.
- Test your home for radon. Test kits are available at hardware and home improvement stores or you can call the Radon Hotline at 1-800-275-8421 in Georgia.
- Install carbon monoxide detectors in your home. They are available at hardware and home improvement stores.

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Location: Forest Park Library
4812 West Street
Forest Park, Georgia 30297

Date: July 8, 2014
Time: 5-7 p.m.

For General Information:
Please visit our information repositories

Forest Park Branch
Clayton County Library System
4812 West Street, Forest Park, Georgia 30297

Hours of Operation
Monday-Tuesday: 9 a.m. to 9 p.m.
Wednesday-Friday: 9 a.m. to 6 p.m.

Clayton County Library
865 Battle Creek Road, Jonesboro, GA 30336
Hours of Operation
Monday-Thursday: 9 a.m. to 9 p.m.
Friday: 9 a.m. to 6 p.m.
Saturday: 9 a.m. to 5 p.m.

You can also sign up to receive information
about the project through email.
To join, please send an email to:
FortGillemVISTudy@gmail.com

Visit and Like our Facebook Page:
<https://www.facebook.com/FortGillemVISTudy>
Follow us on Twitter:
<https://twitter.com/FtGillemVISTudy>

FORT GILLEM

Forest Park, Clayton County, G

Vapor Intrusion

FACT SHEET 2

INTRODUCTION

This fact sheet provides information on the Vapor Intrusion Study being conducted for some homes and businesses in the Fort Gillem area.

LOCATION

Fort Gillem is located about ten miles southeast of Atlanta in Forest Park, Georgia. Fort Gillem is approximately 1,427 acres and is in a mixed-use residential and commercial neighborhood.

HISTORY

Fort Gillem began operations in 1942. During its operation, it was a center for the storage, distribution, maintenance, and disposal of military equipment and supplies. Effective September 15, 2011, Fort Gillem became inactive, except for 257 acres, which is now the Fort Gillem Enclave (under command of Fort Gordon). Fort Gordon is conducting their own Vapor Intrusion Study for the Enclave.

AREAS OF INTEREST

Since 1979, the Army has conducted many environmental investigations and environmental clean-up actions at Fort Gillem. These studies determined that three contaminated sites have impacted the environment around Fort Gillem. For the purposes of this

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WHAT

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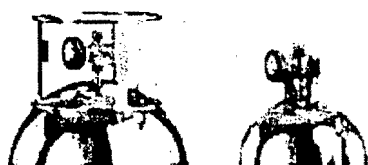
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Areas FTG-07/10 & FTG-09



Photograph 2: Example Summa Canisters



tain VOCs are nail polish, fabric cleaners, paint, air fresheners, and certain specialty cleaners. VOCs can also enter businesses and homes through vapor intrusion caused by openings or cracks in a slab or basement. It is important to investigate indoor air to assess if vapor intrusion is occurring in your home or business.

As the science of environmental understanding improves, it has become clear that vapor intrusion of VOCs from groundwater could pose unwanted health effects and is a risk that needs to be evaluated.

WHAT IS A VAPOR INTRUSION STUDY AND HOW DOES IT WORK?

Because of past waste disposal at Fort Gillem, VOCs have migrated beneath surrounding communities through the groundwater. The Vapor Intrusion Study is needed to determine if the Fort Gillem community has been affected. Air will be collected from inside homes and businesses.

When allowed in a home or business, the sampling process will take two to three days at each location. If your home or business is on a slab foundation or basement, the sampling process will take three days. If your home has a crawl-space beneath it, sampling will take two days. The Army has hired a professional team of environmental experts to conduct the study.

Before the sampling begins, the team members will ask you to fill out a questionnaire and conduct a quick check to see if any household products (ex: air fresheners) could affect the Vapor Intrusion Study. If these products are found, the team asks that you do not use those products during the sampling period.

SAMPLING PROCEDURE (SUB-SLAB OR BASEMENT)

Day 1: Arrive at home or business. In order to collect air samples from beneath the slab, team members will identi-

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DEPARTMENT OF THE ARMY
RIGHT OF ENTRY FOR
ENVIRONMENTAL ASSESSMENT AND RESPONSE

Ft. Gillem, Georgia
(Project, Installation or Activity)

DACA21-9-14-
Right-of-Entry No.

Tract No., Address or Property I.D.

Name and Address of Owner

The undersigned, herein called the "Owner", in consideration for the mutual benefits of the work described below, hereby grants to the UNITED STATES OF AMERICA, hereinafter called the "Government", a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable and assignable right to enter in, on, over and across the land described in Schedule A, for a period not to exceed twenty four (24) months, beginning with the date of the signing of this instrument, and terminating with the earlier completion of the remediation or the filing of a notice of termination in the local land records by the representative of the United States in charge of the **FT. Gillem Project** for use by the United States, its representatives, agents, contractors and assigns, as a work area for environmental investigation and response; including the right to perform sub-slab air sampling, including the installation of sampling ports into the slab or basement floor (if applicable); indoor air sampling; outdoor background air sampling on the property (if applicable); assessment and inventory of residential containers and their contents as necessary to determine their potential impact to indoor air; assessment of the residential structure; soil gas sampling near the foundation of the home (if necessary); and installation and sampling of a groundwater monitoring well on the property (if necessary); and perform any other such work which may be necessary and incident to the Government's use for the investigation and response on said lands; subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowner(s), their heirs, executors, administrators, successors and assigns, all such right, title, interest and privilege as may be used and enjoyed without interfering with or abridging the rights and right-of-entry hereby acquired.

2. The Owner also grants the right to enter and exit over and across any other lands of the Owner as necessary to use the described lands for the purposes listed above.

3. All tools, equipment, and other property taken upon or placed upon the described land by the Government shall remain the property of the Government and may be removed by the Government at any time within a reasonable period after the expiration of this permit or right-of-entry.

4. If any action of the Government's employees or agents in the exercise of this right-of-entry results in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the owner. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet any deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any damages other than those provided for herein.

5. The land subject to this permit or right-of-entry is located in Clayton County, State of Georgia and is particularly described as follows:

SEE ATTACHED SCHEDULE A

WITNESS MY HAND AND SEAL THIS _____ day of _____, 2014.

Owner/Agent/Leasee Contact Number
Signature)

(Landowner/Agent/Leasee

Owner/Agent/Leasee Contact Number
Signature)

(Landowner/Agent/Leasee

UNITED STATES OF AMERICA

BY: _____

CERTIFICATE OF AGENT'S AUTHORITY

I Hereby certify that _____ is/are the owner(s) of the
(name of owner/business)

property located in Clayton County, Georgia, and as shown on the attached
map, which is the subject of the attached Right of Entry.

I certify further, that _____ is my/our agent and is legally
(name of person signing)

authorized to sign said Right of Entry and bind the owner to its terms.

Date: _____

Signature

Please Print Name

Name of Owner

Fort Gillem Vapor Intrusion Study Survey

- 1) Are you familiar with Fort Gillem? (Please circle) YES NO
- 2) Have you ever had concerns with the past operations at Fort Gillem? YES NO
a. If yes: Have you ever contacted Fort Gillem or a government official about your concerns or comments on Fort Gillem? YES NO
- 3) What is your level of understanding related to procedures and methods for environmental sampling and cleanup?
a. High Level of Understanding
b. Medium Level of Understanding
c. Low Level of Understanding
d. No Level of Understanding
- 4) Are you aware of any environmental issues at Fort Gillem or in the surrounding area? YES NO
a. If yes: What were they and did you get involved?
- 5) Are you aware of the environmental remediation (clean-up) efforts taking place at Fort Gillem? YES NO
- 6) Do you know where to get more information on the remediation efforts at Fort Gillem? YES NO
- 7) Are you familiar with Volatile Organic Compounds (VOCs)? YES NO
a. If yes: What is your understanding of them?
- 8) What method of communication do you prefer? (Circle all that apply)
a. Email
b. USPS mail
c. Facebook
d. Twitter
e. Internet
f. Public meetings
g. Other (please specify):
- 9) Can you provide us with your name, address, email, and the best number to reach you at in case your home is identified as a building of interest for this study?
Name: _____
Address: _____
Email: _____
Phone Number: _____
- 10) If we need to come by and talk with you about the study, what times are most convenient for you?
a. 7 to 9 am
b. 9 to 11 am
c. 11 am to 1 pm
d. 1 to 3 pm
e. 3 to 5 pm
f. 5 to 7 pm

Please fill out and send back with the Right to Entry form in the prestamped envelope.

11) Are you interested in learning more about the remediation efforts that are going on at Fort Gillem?

YES

NO

12) In your opinion, where would be some convenient places to hold a public meeting?

Option 1: _____

Option 2: _____

Option 3: _____

13) Do you know of any individuals or groups we should contact concerning the remediation efforts at Fort Gillem?

a. _____

b. _____

c. _____

14) What information do you feel you need about the remediation efforts at Fort Gillem?

15) How long have you lived in the community?

a. Less than 1 year

b. 1 to 5 years

c. 5 to 10 years

d. More than 10 years

16) How do you receive most of your news? (Please circle all that apply)

a. Radio

b. Television

c. Newspaper

d. Internet

e. Facebook

f. Twitter

g. Other (please specify):

17) Do you trust the Army to complete remediation efforts thoroughly?

YES

NO

18) Do you own or rent your home?

RENT

OWN

19) What issues are important to you when it comes to the environmental restoration at Fort Gillem?

a. Health of citizens

b. Health of the environment

c. Time to complete the restoration

d. Costs to complete the restoration

Appendix E: EPA's Occupied Dwelling Questionnaire

Appendix E contains the "Occupied Dwelling Questionnaire" that was originally presented in the EPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance: EPA 2002)*. This information is presented here to provide an example list of questions to ask and issues to be aware of when conducting indoor air samples. Several state health departments also provide indoor air sampling checklists, including Massachusetts (MassDEP, 2002) and California (DTSC 2005). It is recommended that a similar questionnaire be used when collecting indoor air samples at DoD sites.

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: _____

1. Name: _____

Address: _____

Home Phone: _____ Work Phone: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____ At: Home. Work. Cell?

3. Are you the Owner, Renter, Other (please specify) _____
of this Home/Structure?

4. Gender and ages of occupants/persons at this location? _____

5. How long have you lived at this location? _____

General Home Description

6. Type of Home/Structure (check only one): Single Family Home, Duplex,
Condominium, Townhouse, Other, _____

7. Home/Structure Description: number of floors _____

Basement? Yes. No.

Crawl Space? Yes. No.

If Yes, under how much of the house's area? _____%

8. Age of Home/Structure: _____ years. Not sure/Unknown.

9. General Above-Ground Home/Structure construction (check all that apply):

Wood, Brick, Concrete, Cement block, Other, _____

10. Foundation Construction (check all that apply):

Concrete slab.

Fieldstone.

Concrete block.

Elevated above ground/grade.

Other _____

11. What is the source of your drinking water (check all that apply)?

Public water supply.

Private well.

Bottled water.

Other, please specify _____

12. Do you have a private well for purposes other than drinking?

Yes. No.

If yes, please describe what you use the well

for: _____

13. Do you have a septic system? Yes. No. Not used. Unknown.

14. Do you have standing water outside your home (pond, ditch, swale, reek, spring)? Yes. No.

Basement Description, please check appropriate boxes.

If you do not have a basement go to question 22.

15. Is the basement finished or unfinished?

16. If finished, how many rooms are in the basement? _____

How many are used for more than 2 hours/day? _____

17. Is the basement floor (check all that apply) concrete, tile, carpeted, dirt,

Other (describe) _____?

18. Are the basement walls poured concrete, cement block, stone, wood, brick,

other. _____?

19. Does the basement have a moisture problem (check one only)?

Yes, frequently (3 or more times/yr).

Yes, occasionally (1-2 times/yr).

Yes, rarely (less than 1 time/yr).

No.

20. Does the basement ever flood (check one only)?

Yes. frequently (3 or more times/yr).

Yes. occasionally (1-2 times/yr).

Yes. rarely (less than 1 time/yr).

No.

21. Does the basement have any of the following? (check all that apply) Floor cracks.

Wall cracks, Sump, Floor drain, Other hole/opening in floor.

(describe) _____

22. Are any of the following used or stored in the house? (check all that apply)

Paint. Paint stripper/remover. Paint thinner.

Metal degreaser/cleaner. Gasoline. Diesel fuel. Solvents. Glue.

Laundry spot removers. Drain cleaners. Pesticides.

23. Have you recently (within the last six months) done any painting or remodeling in your home? Yes. No.

If yes, please specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes. No.

If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service (check only one box)?

Yes, use dry-cleaning regularly (at least weekly).

Yes, use dry-cleaning infrequently (monthly or less).

Yes, work at a dry cleaning service.

No.

26. Does anyone in your home use solvents at work?

Yes. If yes, how many persons _____

No. If no, go to question 28

27. If yes for question 26 above, are the work clothes washed at home? Yes. No.

28. Where is the washer/dryer located?

Basement.

Upstairs utility room.

Kitchen.

Garage.

Use a Laundromat.

Other, please specify. _____

29. If you have a dryer, is it vented to the outdoors? Yes. No.

30. What type(s) of home heating do you have (check all that apply)

Fuel type: Gas, Oil, Electric, Wood, Coal, Other _____

Heat conveyance system: Forced hot air.

Forced hot water.

Steam.

Radiant floor heat.

Wood stove.

Coal furnace.

Fireplace.

Other _____

31. Do you have air conditioning? Yes. No. If yes, please check the appropriate type(s)

Central air conditioning.

Window air conditioning unit(s).

Other, please specify _____

32. Do you use any of the following? Room fans, Ceiling fans, Attic fan.

Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes. No.

33. Has your home had termite or other pesticide treatment? Yes. No. Unknown.

If yes, please specify type of pest controlled. _____

and approximate date of service _____

34. Water Heater Type: Gas., Electric., By furnace., Other. _____

Water heater location: Basement. Upstairs utility room. Garage. Other. (please describe) _____

35. What type of cooking appliance do you have? Electric, Gas, Other. _____

36. Is there a stove exhaust hood present? Yes. No.

Does it vent to the outdoors? Yes. No.

37. Smoking in Home:

None.. Rare (only guests).. Moderate (residents light smokers)..

Heavy (at least one heavy smoker in household).

38. If yes to above, what do they smoke?

Cigarettes. Cigars. Pipe. Other.

39. Do you regularly use air fresheners? Yes. No.

40. Does anyone in the home have indoor home hobbies of crafts involving: None .

Heating, soldering, welding, model glues, paint, spray paint,

wood finishing, Other. Please specify what type of hobby: _____

41. General family/home use of consumer products (please circle appropriate): Assume that

Never = never used, **Hardly ever** = less than once/month, **Occasionally** = about

once/month, **Regularly** = about once/week, and **Often** = more than once/week.

Product	Frequency of Use
Spray-on deodorant	
Aerosol deodorizers	
Insecticides	
Disinfectants	
Window cleaners	
Spray-on oven cleaners	
Nail polish remover	
Hair sprays	

42. Please check weekly household cleaning practices:

Dusting.

Dry sweeping.

Vacuuming.

Polishing (furniture, etc).

Washing/waxing floors.

Other. _____

43. Other comments: _____

Appendix E

Technical Memo:

Final Fort Gillem Response Action Outline

July 2, 2014

TECHNICAL MEMORANDUM

TO: Owen Nuttall, BRAC Environmental Coordinator, US Army Fort McPherson/Gillem
Tracey Epperley, USACE, Savannah

FROM: Shane Waterman, Wenck Associates, Inc.
Kathryn Swor, Wenck Associates, Inc.

Copy: Cathy Amoroso, US EPA Region 4
Amy Potter, Georgia EPD

DATE: July 2, 2014

SUBJECT: Final Fort Gillem Response Action Outline

The purpose of this memorandum is to present a strategy for the evaluation of air sampling analytical data for the Fort Gillem Vapor Intrusion Study as requested by the Army Corps of Engineers. This memorandum also presents a tiered approach to response actions based on the outcome of the data evaluation activities.

Air sampling data from the Fort Gillem Vapor Intrusion Study Area will be evaluated and the property will be classified into response categories as detailed below. All data would be included in the interim and final reports and included in the risk assessment for Fort Gillem.

Upon receipt of data from vapor intrusion indoor air and sub-slab samples, the following evaluation steps will be used:

- Evaluate the data against Tier I, II, and III criteria (See Table 1 below) within 72 hours of receipt.
- Compare individual analyte concentrations to the evacuation levels equal to 10% of the Lower Explosive Limits (LEL). If any value is higher than the evacuation level (see Table 1 for individual values), the property will be considered Tier I. The resulting action would be immediate action.
- Compare individual analyte concentrations to the Action Levels, which are based on the Vapor Intrusion Screening Level (VISL) calculator using a target cancer risk of 10^{-4} and target hazard quotient of 2. If any value is higher than the Action Level, the property will be considered Tier II. The resulting action would be to initiate prompt site-specific response action. The target hazard quotient was chosen to be consistent with states such as Minnesota and New Jersey that have moved from 3 to a more conservative target hazard level of 2.
- Calculate the cumulative cancer risk and Hazard Index (HI) for the property. If the cumulative cancer risk is above 10^{-4} and/or the HI for a target organ is greater than 2, the property will be considered Tier II. The resulting action would be to initiate site-specific response action.

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Final Response Action Outline
Fort Gillem Vapor Intrusion Study
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- Compare individual analyte concentrations to the May 2014 EPA Regional Screening Levels (RSLs). If any value is higher than the RSL, the property will be considered Tier III. The resulting action would include sending the data to EPA/EPD for review and preparing a letter to the homeowner.
- If the cumulative cancer risk is less than 10^{-4} but greater than 10^{-6} , or if the hazard index for a target organ is less than 2 but greater than 1, the property will be considered Tier III.
- If no value is higher than the RSL, and if the cumulative cancer risk and HI are less than 10^{-6} and 1, the property will be considered Tier IV and the results will be verified and prepared as part of a final report for that property.

Response Action for Tier I:

- Notify EPA and EPD of the data results within 3 days.
- Upon agreement with EPA and EPD, evacuate the property and begin the installation of mitigation measures (see description below).
- Mitigation measures will involve resident relocation and the installation of a mitigation system. The mitigation strategies used to control vapor intrusion in existing buildings are called active depressurization technologies (ADT). The type of ADT system installed depends on whether the building has a crawl space, a basement slab, or a slab-on-grade foundation.
- During ADT system installation, residents would be removed from their property to a local hotel for the duration.
- A certified contractor would be used for the installation of the ADT system.
- If ADT systems are installed in a home or business, a site-specific operation and maintenance plan would be developed and implemented.
- Confirm effectiveness of ADT system using additional data collection and other mitigation system data analysis.
- During sampling and mitigation, Wenck will provide weekly progress reports for EPA and EPD.

Response Action for Tier II

- Notify EPA and EPD of the data result within 3 days.
- Upon agreement with EPA and EPD, draft a letter describing the process and results to the property owner.
- Initiate prompt action of mitigation measures within 21 days.
- NOTE: If the Tier II classification is due to TCE, and sensitive residents are identified, immediate action would be taken commensurate with a Tier I property. This response is due to the potential toxicity to sensitive sub-populations such as women of child-bearing age. The Tier II Target Indoor Air Concentration in a location without sensitive sub-populations for TCE is higher than the criterion for locations with sensitive sub-populations.

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Response Action for Tier III

- Notify EPA and EPD of the data result within 7 days.
- Send data for validation.
- Determine whether the indoor air contaminants may not be attributable to the site or if the data are confounded. In these cases, data would be flagged for further discussion with EPA and EPD.
- Draft a letter describing the process and results to the property owner.
- For chemicals with a Tier III response action level but no Tier II response action level, EPA and EPD will be consulted.
- Tier III properties may qualify for abatement but do not require immediate or prompt action. These properties will be re-evaluated during the second round of sampling, including an evaluation of cumulative cancer risk and HI for target organs. The second round of evaluation will take into account results from the second round of sampling as well as other site-specific information to evaluate future action.

Response Action for Tier IV

- Send data for validation.
- Prepare a report for EPA, EPD, and the homeowner describing the process and result.
- These properties will be re-evaluated during the second round of sampling.

Table 1: Final Tiered Response Action Levels

Analyte	CAS Number	Tier I	Tier I	Tier II		Tier III
		Evacuation Level Air Conc. (% by volume)	Evacuation Level Air Conc. (µg/m3)	VISL Target Indoor Air Conc. (µg/m³)	EPA RSL May 2014 (µg/m³)	
Acetone	67-64-1	0.26%	6.18E+06	6.47E+04	NC	3.20E+04
Benzene	71-43-2	0.12%	3.89E+06	3.60E+01	C	3.60E-01
Benzyl chloride	100-44-7	0.11%	5.70E+06	2.09E+00	NC	5.70E-02
Bromodichloromethane	75-27-4	--	--	7.59E+00	C	7.60E-02
Bromoethene(Vinyl Bromide)	593-60-2	--	--	6.26E+00	NC	8.80E-02
Bromoform	75-25-2	--	--	See Note 10	NA	2.60E+00
Bromomethane	74-83-9	1.00%	3.88E+07	1.04E+01	NC	5.20E+00
1,3-Butadiene	106-99-0	0.20%	4.42E+06	4.17E+00	NC	9.40E-02
n-Butane	106-97-8	--	--	NA	NA	NA
tert-Butyl alcohol	75-65-0	--	--	NA	NA	NA
n-Butylbenzene	104-51-8	--	--	NA	NA	NA
sec-Butylbenzene	135-98-8	--	--	NA	NA	NA

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Analyte	CAS Number	Tier I Evacuation Level Air Conc. (% by volume)	Tier I Evacuation Level Air Conc. ($\mu\text{g}/\text{m}^3$)	Tier II VISL Target: Indoor Air Conc. ($\mu\text{g}/\text{m}^3$)	Tier III EPA RSL May 2014 ($\mu\text{g}/\text{m}^3$)
tert-Butylbenzene	98-06-6	--	--	NA	NA
Carbon disulfide	75-15-0	0.13%	4.05E+06	1.46E+03	NC
Carbon tetrachloride	56-23-5	--	--	4.68E+01	C
Chlorobenzene	108-90-7	0.13%	5.98E+06	1.04E+02	NC
Chloroethane	75-00-3	0.38%	1.00E+07	2.09E+04	NC
Chloroform	67-66-3	--	--	1.22E+01	C
Chloromethane	74-87-3	0.81%	1.67E+07	1.88E+02	NC
3-Chloropropene	107-05-1	--	--	2.09E+00	NC
2-Chlorotoluene	95-49-8	--	--	NA	NA
Cumene	98-82-8	0.09%	4.42E+06	8.34E+02	NC
Cyclohexane	110-82-7	--	--	1.25E+04	NC
Dibromochloromethane	124-48-1	--	--	1.04E+01	C
1,2-Dibromoethane	106-93-4	--	--	4.68E-01	C
1,2-Dichlorobenzene	95-50-1	0.22%	1.32E+07	4.17E+02	NC
1,3-Dichlorobenzene	541-73-1	--	--	NA	NA
1,4-Dichlorobenzene	106-46-7	0.25%	1.50E+07	2.55E+01	C
Dichlorodifluoromethane	75-71-8	--	--	2.09E+02	NC
1,1-Dichloroethane	75-34-3	0.54%	2.19E+07	1.75E+02	C
1,2-Dichloroethane	107-06-2	0.62%	2.51E+07	1.08E+01	C
1,1-Dichloroethene	75-35-4	0.65%	2.58E+07	4.17E+02	NC
1,2-Dichloroethene, Total	540-59-0	--	--	NA	NA
cis-1,2-Dichloroethene	156-59-2	0.97%	3.85E+07	See Note 10	NA
trans-1,2-Dichloroethene	156-60-5	0.97%	3.85E+07	See Note 10	NA
1,2-Dichloropropane	78-87-5	0.34%	1.57E+07	8.34E+00	NC
cis-1,3-Dichloropropene	10061-01-5	--	--	4.17E+01	NC
trans-1,3-Dichloropropene	10061-02-6	--	--	4.17E+01	NC
1,2-Dichlorotetrafluoroethane	76-14-2	--	--	NA	NA
1,4-Dioxane	123-91-1	--	--	See Note 10	NA
Ethylbenzene	100-41-4	0.08%	3.47E+06	1.12E+02	C
4-Ethyltoluene	622-96-8	--	--	NA	NA
Freon 22	75-45-6	--	--	1.04E+05	NC
Freon TF	76-13-1	--	--	6.26E+04	NC
n-Heptane	142-82-5	--	--	NA	NA
Hexachlorobutadiene	87-68-3	--	--	See Note 10	NA

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Analyte	CAS Number	Tier I	Tier I	Tier II		Tier III
		Evacuation Level Air Conc: (% by volume)	Evacuation Level Air Conc. (µg/m3)	VISL Target Indoor Air Conc: (µg/m³)		EPA RSL May 2014 (µg/m³)
n-Hexane	110-54-3	0.11%	3.88E+06	1.46E+03	NC	7.30E+02
				See Note		
Isopropyl alcohol	67-63-0	--	--	10	NA	7.30E+03
4-Isopropyltoluene	99-87-6	--	--	NA	NA	NA
Methyl Butyl Ketone (2-Hexanone)	591-78-6	--	--	6.26E+01	NC	3.10E+01
Methyl Ethyl Ketone	78-93-3	0.14%	4.13E+06	1.04E+04	NC	5.20E+03
methyl isobutyl ketone	108-10-1	0.12%	4.92E+06	6.26E+03	NC	3.10E+03
Methyl methacrylate	80-62-6	0.17%	6.96E+06	1.46E+03	NC	7.30E+02
Methyl tert-butyl ether	1634-04-4	0.16%	5.77E+06	1.08E+03	C	1.10E+01
Methylene Chloride	75-09-2	1.30%	4.52E+07	1.25E+03	NC	1.00E+02
Naphthalene	91-20-3	0.09%	4.72E+06	6.26E+00	NC	8.30E-02
n-Propylbenzene	103-65-1	0.08%	3.93E+06	2.09E+03	NC	1.00E+03
Styrene	100-42-5	0.11%	4.69E+06	2.09E+03	NC	1.00E+03
1,1,2,2-Tetrachloroethane	79-34-5	--	--	4.84E+00	C	4.80E-02
Tetrachloroethene	127-18-4	--	--	8.34E+01	NC	1.10E+01
Tetrahydrofuran	109-99-9	0.20%	5.90E+06	4.17E+03	NC	2.10E+03
Toluene	108-88-3	0.11%	4.15E+06	1.04E+04	NC	5.20E+03
1,2,4-Trichlorobenzene	120-82-1	0.25%	1.86E+07	4.17E+00	NC	2.10E+00
1,1,1-Trichloroethane	71-55-6	0.75%	4.09E+07	1.04E+04	NC	5.20E+03
1,1,2-Trichloroethane	79-00-5	0.60%	3.27E+07	4.17E-01	NC	1.80E-01
Trichloroethene	79-01-6	0.80%	4.30E+07	2.00E+00	NC	4.80E-01
Trichlorofluoromethane	75-69-4	--	--	1.46E+03	NC	7.30E+02
1,2,4-Trimethylbenzene	95-63-6	0.09%	4.42E+06	1.46E+01	NC	7.30E+00
1,3,5-Trimethylbenzene	108-67-8	--	--	1.46E+01	NA	7.30E+00
2,2,4-Trimethylpentane	540-84-1	--	--	NA	NA	NA
Vinyl chloride	75-01-4	0.36%	9.20E+06	1.68E+01	C	1.70E-01
Xylene (total)	1330-20-7	--	--	2.09E+02	NC	1.00E+02
m,p-Xylene	179601-23-1	--	--	2.09E+02	NC	1.00E+02
o-Xylene	95-47-6	0.09%	3.91E+06	2.09E+02	NC	1.00E+02

Notes:

1. Analytes with "NA" will not be evaluated as they have no toxicity or physical/chemical parameter data.
2. Evacuation Level Air Conc. values represent evacuation levels and are 10% of the chemical's Lower Explosive Limit (LEL).
3. For TCE, for sensitive subpopulations, the Target Indoor Air Concentration is $2 \mu\text{g}/\text{m}^3$ and is based on a risk-based target hazard of 1 due to potential short-term noncancer effects to sensitive subpopulations. For non-sensitive subpopulations, the target hazard is 2 and the Target Indoor Air Concentration is $4 \mu\text{g}/\text{m}^3$.
4. EPA RSL - Residential Screening Level, used for screening indoor air.
5. "--" - No LEL or acute criteria are available.

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July 2, 2014

6. Source of Tier II data denoted with "NC" if it was derived from the noncarcinogenic toxicity value or "C" if it was derived from the carcinogenic toxicity value.
7. Tier II Target Indoor Air Conc. based on VISL Calculator using a target cancer risk of 10^{-4} and a target hazard quotient of 2 (version 3.3, May 2014).
8. No RSL is provided for trans-1,2-dichloroethene. The New Jersey Department of Environmental Protection (NJDEP) Rapid Action Level is used as a surrogate.
9. Neither cis-1,2-dichloroethene nor trans-1,2-dichloroethene have inhalation toxicity information. However, each has an oral reference dose; and cis- is 10 times less than trans- according to EPA's Integrated Risk Information System (IRIS) database. Therefore, as surrogates, the NJDEP Rapid Action Level is used as a Tier III surrogate for trans-1,2-dichloroethene and a value 10 times lower is used as a Tier III surrogate for cis-1,2-dichloroethene.
10. EPA and EPD will be consulted if these constituents are detected in indoor air in excess of Tier III concentrations.
11. Shaded rows indicate analytes that have been identified as contaminants of concern for FTG-01, FTG-07/10, and FTG-09.

Appendix F

Replacement Locations

Appendix D

List of Buildings of Interest for Sample Set 1

Helium Leak Test Procedures:

1. Leak test shroud is placed over the installed soil vapor implant.
2. Soil vapor implant was ported thru the sealed chamber.
3. Helium is introduced into the leak test chamber with an initial concentration being measured with a helium detection meter.
4. Soil vapor is transferred into a Tedlar bag via a syringe
5. Helium meter is used to monitor the soil vapors inside the Tedlar bag
6. A final concentration of helium within the shroud is measured to make sure the helium is still present in the chamber in significant concentrations.
7. A leak test is considered to have "passed" if the helium concentrations observed in the vapors coming thru the implant are <10% the shroud concentrations (IRTC guidance document).

APPENDIX ??
List of Replacement Homes

MAP ID	STREET NUMBER	STREET NAME
FTG-01		
153	[REDACTED]	MALLARD CIR
153	[REDACTED]	MALLARD CIR
153	[REDACTED]	MALLARD CIR
153	[REDACTED]	MALLARD CIR
153	[REDACTED]	SLATE RD
153	[REDACTED]	SLATE RD
153	[REDACTED]	SLATE RD
153	[REDACTED]	RYAN RD
153	[REDACTED]	RYAN RD
153	[REDACTED]	RYAN RD
153	[REDACTED]	RYAN RD
153	[REDACTED]	RYAN RD
FTG-09		
926	[REDACTED]	5 th AVE
927	[REDACTED]	5 th AVE
928	[REDACTED]	3 rd AVE
929	[REDACTED]	3 rd AVE
930	[REDACTED]	2 nd ST
931	[REDACTED]	3 rd ST
932	[REDACTED]	4 th ST

Appendix E

Risk Based Screening Values for VI Study

Appendix G

Communicating Environmental Data to Property Owners and Tenants: Standard Operating Procedure

October 2010



COMMUNICATING ENVIRONMENTAL DATA TO PROPERTY OWNERS AND TENANTS

STANDARD OPERATING PROCEDURE

October 2010
EPA Region 4 Superfund
INTERIM FINAL

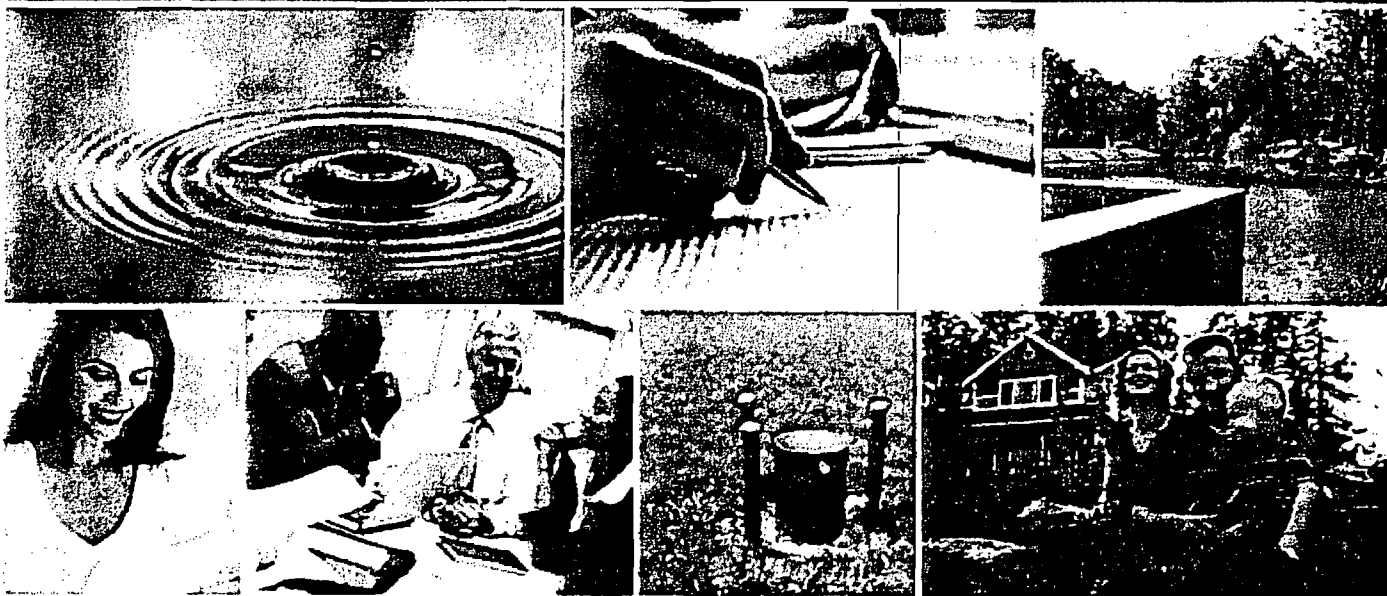


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APPENDICES

A: Keys to Effective Public Communication	G: Sample Letter (Primary Exceedances)
B: Units of Measurement	H: Sample Letter (Secondary Exceedances)
C: Sample Access Letters and Agreements	I: Sample Letter (Lead in Ground Water)
D: Region 4 Records Management Policies Memorandum	J: Sample Letter (Lead in Soil)
E: Region 4 Private Well Monitoring and Analysis Fact Sheet	K: Sample Letter (Air Sampling)
F: Sample Letter (No Exceedances)	L: Sample TSS Memoranda

A. PURPOSE

This Standard Operating Procedure (SOP) provides guidelines for EPA Region 4 Superfund Division staff to follow to effectively communicate environmental data findings to property owners/tenants using status update letters that are accurate, complete, clear, consistent and readable for a general audience, in accordance with EPA's *Correspondence Manual*. The SOP's appendices provide additional information, reference resources and sample property owner/tenant letters. The SOP is a living document that will be updated as needed over time.

B. APPLICABILITY

This SOP is applicable when Region 4 Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs) need to communicate sampling/monitoring results to property owners/tenants using status update letters. The SOP applies to all media: ground water, soil, surface water, sediment and air.

Property owner/tenant letters should be distributed in a timely fashion. Once sampling data are received (including preliminary data), the RPM/OSC/SESD/Contractor should compare all detections to the most up-to-date Regional Screening Levels (RSLs) and Maximum Contaminant Levels (MCLs).¹ If an RSL or MCLs is exceeded, summary data for the exceedance should be submitted to EPA Region 4's Technical Services Section (TSS) for review. TSS will provide RPMs and OSCs with the most up-to-date information for Removal Action Levels (RALs) and will make recommendations for potential future actions (e.g., providing an alternative source of drinking water, taking additional samples; see Appendix L for sample TSS memoranda). RALs are risk-based calculated values developed by EPA to determine whether sample concentrations are sufficiently elevated that they may warrant the use of Superfund's removal response authority. Exceedance of an RAL does not by itself require a removal action, nor does it imply that adverse health effects will occur.

TSS will prioritize evaluation of private-well data. Verbal notification of the property owner/tenant by phone or in-person should occur immediately if levels of concern are identified by TSS. This notification of the property owner/tenant should be documented appropriately (see section G) and will generally be completed by the responding OSC/RPM. *Unless there are extenuating circumstances, RPMs and OSCs should provide sampling information and data to property owners/tenants via status update letters within four-to-six weeks of receiving analytical results (final results should be available prior to a letter mailing).* Courtesy copies of the letters should also be provided to state agencies and local health departments, as appropriate.

C. DEFINITIONS

ATSDR: Agency for Toxic Substances and Disease Registry. ATSDR is the principal federal public health agency involved with hazardous waste issues. The agency is responsible for preventing or reducing the harmful effects of exposure to hazardous substances on human health and quality of life. More information available at: www.atsdr.cdc.gov.

¹ SESD = EPA Region 4's Science and Ecosystem Support Division. See Section C for more information.

CIC:	EPA Community Involvement Coordinator
Constituent:	Material(s) of potential concern that EPA is sampling for at a given location. The use of the term is standardized throughout the SOP, in place of similar references including "analyte," "contaminant," "chemical," and "element."
Data Qualifier:	EPA letter codes appended to numeric data (or in some instances used alone) to describe the quality of each piece of data to the data user. Also referenced as "data qualifier flags."
ERRB:	Region 4 Emergency Response and Removal Branch
Final Data:	Data reviewed by EPA and released to the project manager. It usually represents the final data that will be placed into a site record, unless the project manager identifies site-specific issues, such as errors relating to sample location identification.
Health-Based Benchmarks:	MCL, RSL or other health-related values (e.g., Drinking Water Health Advisories).
MCL:	Maximum Contaminant Level. MCLs are the National Primary Drinking Water Regulations established by EPA that set mandatory water quality standards for drinking water contaminants in regulated Public Water Systems (PWSs). An MCL is the maximum permissible level of a contaminant in water delivered to any user of a PWS. MCLs are enforceable standards under the Safe Drinking Water Act.
µg/L:	Micrograms per liter ²
mg/L:	Milligrams per liter
NSDWR:	National Secondary Drinking Water Regulations. Regulations established by EPA that set non-mandatory standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels." NSDWRs are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. These contaminants are not considered to present a risk to human health at the secondary maximum contaminant level.
OSWER:	EPA Office of Solid Waste and Emergency Response
Preliminary Results:	These results are generally provided by a laboratory prior to internal review and without the supporting documentation. They are subject to changes in the final laboratory report.
Pre-Review Data:	The final laboratory report from a contract laboratory; data may have been subjected to electronic review by the Sample Management Office contractor. Pre-Review data has not been reviewed by EPA data validation staff and is subject to change and/or having different data qualifiers attached to it.
Property Owner/Tenant:	Legal property owner or people occupying a property (e.g., renters, leasers).
RAL:	Removal Action Level. RALs are risk-based calculated values developed by EPA to determine whether sample concentrations are sufficiently elevated that they may warrant the use of Superfund's emergency response authority. Exceedance of an RAL does not

² Please see Appendix B for a list of sampling-related measurement units.

necessarily warrant a removal action or imply that adverse health effects will occur. Target risk levels for calculating generic RALs are an extension of the Superfund program's *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions* (OSWER Directive 9355.0-30).

Remedial Project Manager (RPM) / On-Scene Coordinator (OSC):

The official designated by the lead agency to coordinate, monitor and/or direct response actions (removal and/or remedial) under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

RSLs:

Regional Screening Levels (formerly Preliminary Remediation Goals, or PRGs). These EPA screening levels are developed using risk assessment guidance from the Superfund program for use at Superfund sites. RSLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. RSLs are used for site screening and as initial cleanup goals, if applicable. The use of RSLs in site screening is to help identify areas, contaminants and conditions requiring further federal attention at a particular site. RSLs are considered by EPA to be protective for humans over a lifetime. However, RSLs are not always applicable to a particular site and do not address non-human health endpoints, such as ecological impacts. RSL information is available online at: www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

SDMS:

Superfund Document Management System

SESD:

EPA Region 4's Science and Ecosystem Support Division. SESD serves as a provider of scientific and technical expertise for environmental data collection and analysis for Region 4 program offices.

SOP:

Standard Operating Procedure. An SOP is a set of written instructions that document a routine activity followed by an organization.

TSS:

EPA Region 4's Technical Services Section of the Region 4 Superfund Support Branch. TSS serves as an "in-house consultant" to the Superfund program and provides support to other Region 4 Divisions. TSS staff share their expertise in hydrogeology, human health, and radiological and ecological risk assessment. TSS staff review reports, provide site-specific consulting services, and participate in projects, guidance development and publications that address multiple sites. The TSS website provides additional information: www.epa.gov/region4/waste/ots/index.html.

D. PERSONNEL QUALIFICATIONS

EPA RPMs and OSCs have overall responsibility for conformance with this SOP in effectively communicating sampling/monitoring results to property owners/tenants using status update letters. RPMs and OSCs need to understand the sampling methods, detection limits and constituents to be sampled for at a given property. TSS is available as an information resource during the planning stages for sampling activities. OSCs and RPMs go through formalized programmatic and technical training and mentoring that qualifies them to investigate, make technical evaluations and take appropriate response actions to incidents involving contaminated media.

E. PROCEDURAL STEPS

0. Heading

The letter heading should include four components: an EPA logo, Region 4's address, addressee information and a subject heading.

Sample Heading



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

[Addressee Name]
[Street Address]
[City, State, Zip Code]

SUBJECT: Sampling Results for Property at [Address]

1. First Paragraph: Introduction

This paragraph provides a general overview of sampling activities conducted. Key information to include: the date of sampling, the type of media sampled, the purpose of the sampling and the availability of results.

Sample Introductory Paragraph

During the week of [date], the United States Environmental Protection Agency (EPA) conducted [type of media – well water, soil, sediment, air, ground water] sampling on your property at [address]. The purpose of the sampling was to determine whether contamination was present in the [type of media] that may be related to the [site name] and to evaluate if any further response actions are necessary to protect public health and the environment. [Additional sentence that describes the site's address and location in relation to the property, as relevant.] The analytical results from the samples that EPA collected from your property are enclosed.

2. Second Paragraph: Sampling Overview

This paragraph describes:

- a. The number of samples taken and the constituents that were sampled for. The description may also include how the sampling was done (e.g., pre- and post-filter sampling, pre- and post-purge samples, manual soil sampling). The OSC/RPM should consult with TSS and/or SESD as needed during the planning stages for sampling activities.
- b. Why these constituents were sampled for (e.g., the ABC Company was an XYZ type of facility and these constituents can be associated with this type of operation).

Sample Second Paragraph (ground water, filter sampling)

Because you have a whole house filter system, EPA collected two samples from your property: one sample was collected before filtration in order to evaluate the quality of the untreated ground water and a second sample was collected after filtration to evaluate the quality of the treated tap water in your home. Both of the samples collected from your property were analyzed for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organochlorine pesticides, polychlorinated biphenyls (PCBs) and cyanide. The unfiltered sample was analyzed for the additional parameters of acidity, alkalinity and sulfate to further evaluate potential influence from the [site name].

Sample Second Paragraph (ground water, draw and purge sampling)

Elevated heavy metals in private drinking water can be a result of the leaching of metals in plumbing pipes, fittings and pumps into water resources. As a result, your well was resampled using a technique called a "first draw," followed by a purge, or emptying, of the standing water in the pipes and then a second, post-purge sample. Since your home has a whole house filter installed, two samples were taken following the purge of standing water: a post-purge, pre-filter sample and a post-purge, post-filter sample. A duplicate sample was also taken to duplicate the post-purge, post-filter sample.

Sample Second Paragraph (soil, manual surface and sub-surface sampling)

Two investigative samples were collected on the property in August 2004; one soil sample was collected in the front yard and one soil sample was collected in the back yard. The investigative samples consisted of five subsamples taken within a five-foot diameter area, at a 0-3 inch depth, and combined into one sample. The soil samples collected were analyzed for arsenic, chromium and copper.

3. Third Paragraph: Results Introduction



This paragraph explains how the sampling results for a property are reported. A summary table or tables of the results should be provided. The table's information and formatting should be consistent across the materials shared with all property owners/tenants. As appropriate, laboratory sheets can be included as an enclosure. Due to the technical nature and length of these sheets, it is recommended that, in most cases, the letter indicate their availability and note that copies can be provided upon request.

Appendix E provides a fact sheet which helps clarify target constituents, analytical methods and reporting levels. As a resource for letter recipients, OSCs/RPMs should reference the Region 4 website (www.epa.gov/region4/waste/ots/index.html) for this fact sheet in the letters.

Sample Third Paragraph (constituent detection, without laboratory data sheets)

The results are provided in the enclosed summary table, which compares the constituents detected in each sample to applicable health-based benchmarks. Please note that only constituents detected above Regional Screening Levels (RSLs) and/or Maximum Contaminant Levels (MCLs) are included in the summary table. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website also provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

Sample Third Paragraph (no constituent detection, without laboratory data sheets)

There were no constituents detected that exceeded any applicable health-based benchmarks for your property. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website also provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

Sample Third Paragraph (constituent detection, with laboratory data sheets)

The results are provided in two formats: a summary table and laboratory data sheets. The summary table compares the constituents detected in each sample to applicable health-based benchmarks. Only constituents detected above Regional Screening Levels (RSLs) and/or Maximum Contaminant Levels (MCLs) are included in the summary table. The laboratory data sheets, which are the source from which the summary table was compiled, list all of the potential constituents analyzed for during the sampling. The laboratory data sheets also provide an explanation of the data qualifiers used in the data sheets. Please note that any result on the laboratory data sheets with a "U" qualifier means that a constituent was not detected in the samples. Region 4's website provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

Sample Summary Table^{*, #}**Summary Table: [Property Address]**

Constituent	Health Screening Level	Comparison	10/27/2009	10/27/2009	02/23/2010
			PW-07	PW-13	PW-12
Barium	2,000	MCL	0.91 J	1.3 J	2,170
Copper	1,300	MCL	4 J	2,800	0.11 J
Iron	26,000	RSL	37,000	3,800	3,400 J
Manganese	880	RSL	960	1,100	900
Notes:					
All values are in micrograms per liter (µg/L)					
J = The identification of the constituent is acceptable; the reported value is an estimate					
MCL = federal drinking water Maximum Contaminant Level					
NA = Not analyzed					
ND = Not detected above the laboratory detection limit					
RSL = www.epa.gov/reg3hwmd/risk/human/rb-concentration-table/index.htm					
Bolded and highlighted = value exceeds the associated health-based screening criterion					

* Note: As illustrated in this example, only constituents exceeding RSLs or MCLs are included in the summary table for a property. As appropriate, laboratory sheets can be included as an enclosure. Due to the technical nature and length of these sheets, it is recommended that, in most cases, the property owner/tenant letter indicate their availability and note that copies can be provided upon request.

Note: Other federal, state and local government screening levels are not typically evaluated in this process.

4. Fourth Paragraph: Findings Summary

This paragraph explains the sampling results for a property. In situations where sampling identifies non-site-related contamination (e.g., lead from plumbing, natural background metals), the letter should reference available information resources (e.g., ATSDR ToxFAQs) and organizations (e.g., the local health department) so that property owners/tenants are as informed as possible regarding potential risks and options.

Initial screening and evaluation will have been conducted using the most up-to-date RSLs and MCLs. If constituent levels at a property are above RSLs or MCLs, the RPM or OSC should consult with TSS. OSCs and RPMs may consult with TSS at any time, whether or not constituent levels are above RSLs and MCLs.

TSS will make recommendations for potential future actions (e.g., providing an alternative source of drinking water, taking additional samples; see Appendix L for sample TSS memoranda) based on the most current RALs and the site-specific information provided by the OSC/RPM. When constituent levels are detected above RALs, the OSC/RPM and TSS should coordinate any decisions to take action with the Region 4 Emergency Response and Removal Branch (ERRB). If EPA decides to take action, such as providing bottled water, the OSC/RPM will contact the property owner/tenant and explain the situation. Based upon the technical aspects of the incident, additional sampling may be considered to confirm previous results and/or monitor for potential future contamination. If the first round of sampling results exceeds health-based benchmarks and

the second round of sampling results does not, the OSC/RPM should consult with TSS to determine if a third round of sampling is necessary. Quarterly monitoring for seasonal fluctuations may also be considered.

For sites where actions are recommended, like providing an alternative water source or excavation of surface soils, the OSC/RPM should be in verbal contact with the property owner/tenant to explain the information contained in the letter. The letter should never be the first form of communication with the property owner/tenant when actions are to be taken.

Sample Fourth Paragraph (no constituents found, with health-based benchmark reference)

EPA has evaluated the sampling results and has determined that there are no constituents detected in your well that are above EPA Regional Screening Levels (RSLs). Because this sampling event was based on concerns about contamination associated with the [site name], some constituents, like nitrates and bacteria, that are known to be common problems in household wells were not included in this analysis.

Sample Fourth Paragraph (no constituents found, with site operations reference)

EPA has evaluated the sampling results and has determined that there are no constituents detected in your well that are attributable to the former [ABC Plant's] operation. Because this sampling event was based on concerns about contamination associated with the [site name], some constituents, like nitrates and bacteria, that are known to be common problems with household wells were not included in this analysis.

Sample Fourth Paragraph (constituents identified, TSS review)

The sampling results have been reviewed by EPA. In the unfiltered sample, several constituents, including manganese and cobalt, were detected above their respective health-based benchmarks. The results from the filtered sample indicate that the whole house filter system is successfully removing manganese, cobalt and all other constituents of concern, with the exception of sodium, to levels below health-based benchmarks. Sodium levels in your filtered water are increased by the treatment system from 5.7 milligrams per liter (mg/L) to 78 mg/L. This result exceeds the non-regulatory EPA Office of Water, Drinking Water Advisory level of 20 mg/L for sodium for individuals on a restricted sodium diet. If anyone in the household is on a restricted sodium diet, consider consulting a physician to discuss options for managing sodium intake. There are no other constituents detected in the filtered sample that exceed EPA's National Primary Drinking Water Regulations or other health-based benchmarks. EPA recommends maintaining the whole house filter system in accordance with manufacturer recommendations.

Sample Fourth Paragraph (constituents identified, RALs and soil)

The soil samples collected from your property were analyzed for arsenic, chromium and copper. EPA has evaluated the sampling results and determined that arsenic is present in the soil on your property in concentrations that exceed EPA Removal Action Levels (RALs). EPA has determined that soil excavation in the backyard is warranted. In the meantime, EPA recommends as a prudent precaution that you limit exposure to the soil in your yard. Most importantly, take care to prevent incidental ingestion of contaminated soil by washing your hands after working in your yard or garden. Also, take particular care to clean hands and toys of young children if they have been playing in the yard.

5. Fifth Paragraph: Additional Information Resources

This paragraph provides the property owner/tenant with additional information resources so that they can learn more and remain informed over time. As appropriate, EPA staff may need to contact local government agencies, like a county health department, to request an appropriate contact for drinking water issues or other media-related concerns. This outreach can also provide an opportunity for EPA staff to update the agencies regarding recent sampling activities and related next steps, if any. Also, remember to reference ATSDR as a resource when potential exposure to contamination exists.

Sample Fifth Paragraph (additional EPA information)

Please find enclosed a pamphlet that provides general information about drinking water from home wells. For more information regarding private wells in general, EPA's website at water.epa.gov/drink/info/well/index.cfm provides information for private well users who rely on their wells for drinking water and household use.

Sample Fifth Paragraph (additional EPA, ATSDR and local information)

Please find enclosed a pamphlet that provides general information about drinking water from home wells. For more information regarding private wells in general, EPA's website at water.epa.gov/drink/info/well/index.cfm provides information for private well users who rely on their wells for drinking water and household use. It is important to remember that well owners have primary responsibility for the safety of the water drawn from their well. EPA recommends testing your water every year for total coliform bacteria, nitrates, total dissolved solids and pH levels. If other contaminants are suspected, make sure to test for those constituents as well. For more information on ground water quality in the area, well owners should contact the [State or County Name] Health Department at [123-456-XXXX] and/or the Agency for Toxic Substances and Disease Registry (ATSDR; www.atsdr.cdc.gov) for information, available services and guidance. Names and contact information can be provided upon your request. The [AnyState] Division of Public Health provides information on well sampling. They can be contacted at [123-456-XXXX]. For more information about the [site name], please see [\[www.epaossc.org/site/site_profile.aspx?site_id=5527\]](http://www.epaossc.org/site/site_profile.aspx?site_id=5527). For general information about the Superfund program, which cleans up contaminated sites, please see www.epa.gov/superfund.

6. Sixth Paragraph and Signature: Upcoming Activities and EPA Contacts

The purpose of the closing paragraph is to explain what next steps, if any, will take place following the sampling event and analysis of sampling results. This paragraph describes relevant upcoming activities for the property owner/tenant, like public meetings or other site or sampling-related events. The paragraph also provides information regarding any additional planned sampling activities. Finally, the paragraph and signature block provides contact information for relevant EPA site staff.

Sample Sixth Paragraph and Signature Block (no ongoing activities)

At this time, EPA has not scheduled a meeting to discuss the [Month, Year] sampling results. If residents with private wells would like EPA to host a meeting, please contact [EPA staff member], our [Community Involvement Coordinator], at [800-XXX-XXXX] (toll-free), directly at [404-562-XXXX] or by e-mail at [lastname.firstname@epa.gov]. Alternatively, please do not hesitate to contact either [CIC's first name] or myself (contact information below) if you have any questions about the sampling results.

Sincerely,

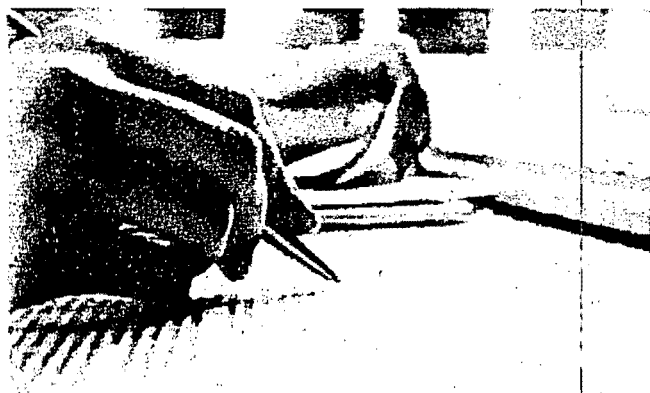
[EPA staff name]

[EPA staff title]

[Section or Branch]

Telephone: [404-562-XXXX]

E-mail: [lastname.firstname@epa.gov]



Sample Sixth Paragraph and Signature Block (ongoing activities)

The next quarterly drinking water well monitoring event is scheduled to take place the week of [Month Day, Year]. If you have any questions or would like additional information, please feel free to contact me directly at [(404) 562-XXXX], or by e-mail at [lastname.firstname@epa.gov]. Regarding any questions about the resampling event or previous sampling results, please contact [EPA staff title] [EPA staff name] at [(404) 562-XXXX] or by e-mail at [lastname.firstname@epa.gov]. For general questions regarding EPA involvement at this site, please contact [EPA staff title] [EPA staff name] at [(800) XXX-XXXX] (toll-free) or directly at [(404) 562-XXXX], or by e-mail at [lastname.firstname@epa.gov].

Sincerely,

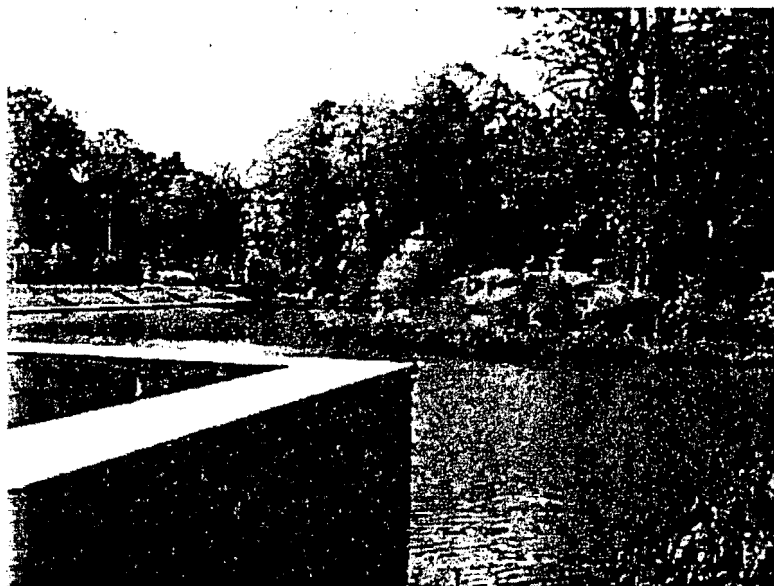
[EPA staff name]

[EPA staff title]

[Section or Branch]

Telephone: [(404) 562-XXXX]

E-mail: [lastname.firstname@epa.gov]



F. CHECKLIST

Pre-Sampling

- ☐ Review the sampling methods, detection limits and constituents to be sampled for. Reference the EPA Region 4 Field Branches Quality System and Technical Procedures documents as needed (see Section I). Full scan analysis should be considered unless previous site information is available to focus sampling.
- ☐ Ensure that access agreements are signed (see Appendix C for sample agreement).
- ☐ Consult with TSS as needed during the planning stages for sampling activities.
- ☐ Identify the addresses of the property owners/tenants who will need to receive a letter following sampling activities and analysis of sampling results.
- ☐ Select the Region 4 reviewers for the property owner/tenant letter.

Post-Sampling

- ☐ Once sampling data are received, the RPM/OSC/SESD/Contractor should compare all detections to RSLs and MCLs. If RSLs or MCLs are exceeded, summary data for exceedances should be submitted to TSS for review.
- ☐ TSS will make recommendations for potential future actions (e.g., providing an alternative source of drinking water, taking additional samples) based on the most current RALs and the site-specific information provided by the OSC/RPM. Note: when constituent levels are detected above RALs, the OSC/RPM and TSS should coordinate any decisions to take action with ERRB.
- ☐ Develop a letter review timeline and deadline for mailing letters to property owners. Share the letter review timeline with the Region 4 reviewers and TSS (as needed) and revise the timeline based on reviewer feedback.
- ☐ Based on sampling results, select the appropriate letter template from the SOP appendices.
- ☐ Adapt the selected letter template based on site characteristics and sampling findings and in accordance with the SOP.
- ☐ Develop the results summary table(s) and incorporate into property owner/tenant letter.

Post-Sampling (continued)

- ☐ Identify information resources and contact local resource organizations as appropriate. Reference the information resources and organizations in the fifth paragraph of the letter.
- ☐ Confirm upcoming activities (e.g., resampling, availability session), if any, and incorporate information into the final paragraph of the letter.
- ☐ Circulate the draft property owner/tenant letter for internal Region 4 review.
- ☐ Incorporate reviewer comments and finalize the letter.
- ☐ Create signed, addressed letter copies for all identified property owners and tenants. Make sure that the language in each letter is consistent for all property owners and tenants.
- ☐ Enclose information materials and laboratory data sheets, as appropriate, and circulate the property owner/tenant letters. Provide copies of the letter to state agencies and local health departments, as appropriate, and place a signed copy of the correspondence in the file.

G. RECORDS MANAGEMENT

This SOP requires the generation of the following records:

<u>Record</u>	<u>Responsible Person</u>	<u>Record Location</u>
Property Owner/Tenant Correspondence (file copy)	RPM / OSC	Superfund Document Management System (SDMS) file

All records will be maintained in accordance with the EPA *Records Management Manual* and Region 4's June 2010 *Responsibilities for Complying with EPA's Records Management Policies Memorandum* (see Appendix D).

H. QUALITY ASSURANCE & QUALITY CONTROL

To ensure quality assurance and quality control in the successful communication of environmental data to property owners/tenants, the OSC/RPM and the Section Chief, or their designee, need to review each draft letter (or set of letters) and sign off on each letter following review. Review of the letters by the Community Involvement Coordinator (CIC) and TSS is optional. The OSC/RPM should sign each letter sent to the property owners/tenants (see pages 10-11). The file copy of the letter should include a signature block for the Section Chief (and the CIC and TSS, if applicable).

I. REFERENCES AND RESOURCES

Communicating Environmental Data to Property Owners/Tenants

EPA Region 4 Sampling Benchmarks and Detection Levels Reference

Available online at: www.epa.gov/region4/waste/ots/index.html.

EPA Private Well Information for Well Users

Available online at:

water.epa.gov/drink/info/well/index.cfm.

ATSDR ToxFAQs Hazardous Substance Fact Sheets

Available online at:

www.atsdr.cdc.gov/toxfaqs/index.asp.

Public Involvement

EPA Correspondence Manual

Available online at:

intranet.epa.gov/agcyintr/EPA%20Correspondence%20Manual.4.2007.pdf.

EPA Public Involvement Website

This website includes a wide range of information about working constructively with the public and provides inventories of tools and resources, many of which are useful from a technical assistance perspective. The site also contains Office of Management and Budget-approved feedback and evaluation surveys. Available online at: www.epa.gov/publicinvolvement/index.htm.

EPA Public Involvement Policy

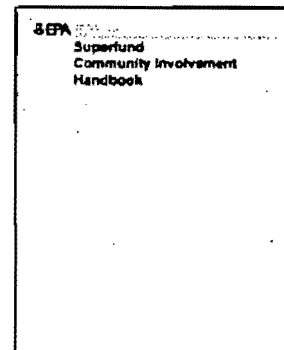
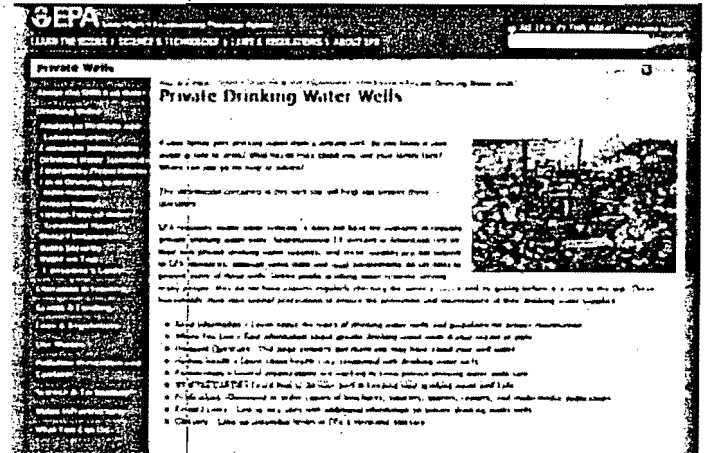
In 2003, EPA released its updated Public Involvement Policy. The policy describes seven basic components of an effective public involvement program. Available online at: www.epa.gov/publicinvolvement/policy2003.

Superfund Community Involvement Handbook and Toolkit

This practical reference manual explains the philosophy, principles and procedures for a state-of-the-art public outreach and involvement program. It includes comprehensive instructions on how to implement almost 50 best practices and methods, including technical assistance. It also provides specific examples and templates that enhance the efficiency and effectiveness of these public involvement activities. Its appendix contains several of the most significant Superfund guidance directives on public involvement. Available online at: www.epa.gov/superfund/community/involvement.htm.

OSWER Community Engagement Initiative Implementation Plan

The Community Engagement Initiative Implementation Plan is designed to enhance OSWER and regional offices' engagement with local communities and other stakeholders (e.g., state and local governments, tribes, academia, private



industry, other federal agencies, non-profit organizations) to help them meaningfully participate in government decisions on land cleanup, emergency preparedness and response, and the management of hazardous substances and waste. Available online at: www.epa.gov/oswer/engagementinitiative.

EPA Community Involvement in Superfund Risk Assessments

This supplement to EPA's *Risk Assessment Guidance for Superfund* provides suggestions on how technical staff and community members can work together constructively during the early stages of a site cleanup. It includes questions that should be asked, discusses effective involvement techniques and suggests good sources of information and support. Available online at: www.epa.gov/oswer/riskassessment/ragsa/ci-ra.htm.

EPA Public Participation Guidance for On-Scene Coordinators: Community Relations and the Administrative Record

EPA's July 1992 guidance explores opportunities for effective public involvement in the context of removal actions. Public participation processes for removal actions are designed to ensure an appropriate level of public involvement without causing unnecessary delay. Available online at: nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000KNPY.txt.

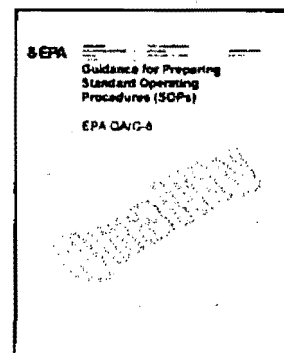
International Association for Public Participation

Core Values for Public Participation and Public Participation Toolbox.
Available online at: www.iap2.org.

Standard Operating Procedures (SOPs)

EPA Guidance for Preparing Standard Operating Procedures (SOPs)

This April 2007 guidance provides a standard working tool that can be used to document routine quality system management and technical activities for environmental data. Available online at: www.epa.gov/quality/qs-docs/g6-final.pdf.



EPA Memorandum for the Role of the Baseline Risk Assessment in Superfund Remedy Decisions

The objective of this memorandum is to provide further guidance to EPA staff on how to use the baseline risk assessment to make risk management decisions. This memorandum also clarifies the use of the baseline risk assessment in selecting appropriate remedies, promotes consistency in preparing site-specific risk assessments, and helps ensure that appropriate documentation from the baseline risk assessment is included in Superfund remedy selection documents. Available online at: www.epa.gov/oswer/riskassessment/baseline.htm.

EPA Region 4 Field Branches Quality System and Technical Procedures

These April and May 2009 documents contain routine field sampling and measurement procedures and quality control documents used by field investigators of the two Science and Ecosystem Support Division (SESD) Field Branches: the Ecological Assessment Branch and the Enforcement and Investigations Branch. Available online at: www.epa.gov/region4/sesd/fbqstp.

EPA Records Management Manual

This February 2007 manual prescribes the requirements and responsibilities for conducting EPA's records management program to ensure that the Agency is in compliance with federal laws and regulations, EPA policies and best practices. Available online at: www.epa.gov/records/policy/manual/index.htm.

Appendix A

Keys to Effective Public Communication

Keys to Effective Public Communication

1. **Minimize the use of jargon and technical language – aim for clear, direct communication.**
2. **Ensure that the property owner/tenant letters accurately summarize the sampling results.**
Disclose that samples were only tested for site-related constituents and that the results do not indicate the overall safety of the media sampled. Disclose any laboratory testing limitations that may impact findings regarding the overall safety of the media sampled. Clearly communicate the purpose of sampling activities (i.e., sampling looks only at site-related constituents and is not conducted to provide routine testing required for public water systems or EPA-recommended testing for private wells.) Accurately summarize sampling results in the letter and the letter's summary table. Clearly state any next steps that will take place following the sampling event and provide fact sheets, contact information and online resources to address relevant subjects in greater detail.
3. **Rely on Region 4's quality-review process for the communication of sampling results to ensure that letters to property owners/tenants are accurate, complete, clear, consistent and readable for a general audience.** The OSC/RPM and the Section Chief, or their designee, need to review each draft letter (or set of letters) and sign off on each letter following review. Review of the letters by the Community Involvement Coordinator and TSS is optional. The OSC/RPM should sign each letter sent to the property owners/tenants (see pages 10-11). The file copy of the letter should include a signature block for the Section Chief (and the Community Involvement Coordinator (CIC) and TSS, if applicable).
4. **Make sure that property owner/tenant letters are distributed in a timely fashion.** A comparison against the RSLs and MCLs should be completed as soon as data (including preliminary data) is available and provided to TSS if any exceedances are identified. TSS will provide RPMs and OSCs with the most up-to-date information for RALs and will make recommendations for potential future actions (e.g., providing an alternative source of drinking water, taking additional samples; see Appendix L for sample TSS memoranda). TSS will prioritize evaluation of private-well data. Verbal notification of the property owner/tenant by phone or in-person should occur immediately if levels of concern are identified by TSS. This notification of the property owner/tenant should be documented appropriately (see section G) and will generally be done by the responding OSC/RPM. *Unless there are extenuating circumstances, RPMs and OSCs should provide sampling information and data to property owners/tenants via status update letters within four-to-six weeks of receiving analytical results (final results should be available prior to a letter mailing).* Courtesy copies of the letters should also be provided to state agencies and local health departments, as appropriate.
5. **Be informed.** OSCs/RPMs need to understand the sampling methods, detection limits and the constituents to be sampled for at a given property. TSS is available as an information resource during the planning stages for sampling activities.
6. **Provide an accessible summary table of results.** An effective summary table should include relevant results from all samplings; health screening levels for constituents listed in the table; and a clear designation indicating when a constituent was not detected.
7. **Provide adequate explanation of the limits and action levels.** Residents may not understand the purpose of, or the differences in, these standards of measurement.

8. **Follow EPA guidelines for effective communication with the public.** See Section I of the SOP.
9. **Provide property owners/tenants with directions on where they can obtain further information.** EPA's website (water.epa.gov/drink/info/well/index.cfm) provides information for private well users who rely on their wells for drinking water and household use. It may also be appropriate to contact local organizations like a local health department to request an appropriate contact for local drinking water or other concerns and include this information in the letter.

Appendix B

Units of Measurement

Units of Measurement

Soils

Milligram per kilogram (mg/kg): one part per million or defined as ppm.

Microgram per kilogram ($\mu\text{g/kg}$): one part per billion or ppb.

Nanograms per kilogram (ng/kg): one part per trillion or defined as ppt.

Water

Milligram per kilogram (mg/L): one part per million or defined as ppm.

Microgram per liter ($\mu\text{g/L}$): one part per billion or defined as ppb.

Nanograms per liter (ng/L): one part per trillion or defined as ppt.

Air

Millions of particles per cubic foot (mppcf): one part per million or defined as ppm.

Microgram per cubic meter ($\mu\text{g/m}^3$): one part per billion or defined as ppb.

Nanogram per cubic meter (ng/m^3): one part per trillion or defined as ppt.

Parts per billion carbon (ppbC).

Parts per billion by volume (ppbV).

Radiation

Curie (Ci): A standard measurement for radioactivity, specifically the rate of decay for a gram of radium – 37 billion decays per second. A unit of radioactivity equal to 3.7×10^{10} disintegrations per second.

Pico Curie (pCi): One pCi is one trillionth of a Curie, 0.037 disintegrations per second, or 2.22 disintegrations per minute.

PicoCuries per gram (pCi/g): for soil measurements.

PicoCuries per kilogram (pCi/kg): for soil measurements.

PicoCuries per meter squared (pCi/L): for water measurements.

PicoCuries per meter squared (pCi/m^2): for surface area measurements.

PicoCuries per meter squared (pCi/m^3): for air measurements.

PicoCuries per meter squared (pCi/m^2): for surface area measurements.

Radiation dose, counts per minute (cpm): direct field measurement.

Radiation dose, microRoentgen per hour ($\mu\text{R/hr}$): direct field measurement.

Radiation dose, millirem per year (mrem/yr): annual measurement.

Appendix C

Sample Access Letters and Agreements

Ground Water Sampling Access Agreement Cover Letter and Access Request Form



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4**

**SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303**

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

Dear Ms. Public:

The U.S. Environmental Protection Agency (EPA) would like to conduct sampling of your home well at 123 North Main Street. EPA is undertaking this effort in order to determine the nature and extent of solvent contamination, specifically, perchloroethylene (PCE), in drinking water related to the XYZ Corporation site; and to evaluate if any further response actions are necessary to protect public health and the environment. In order to determine this contamination, EPA is planning on sampling both active and inactive wells in your neighborhood.

EPA would like your well to be included in this investigation. If you would like EPA to sample your well as part of this investigation, please sign and return the attached Well Sample Access Request form in the enclosed envelope no later than October 30, 2009. This access form will serve as your agreement to allow EPA to sample your well.

EPA will need access to your well during the week of November 9, 2009 for this investigation. The actual sampling will be conducted by an EPA contractor and Any County Health Department representatives. Your well should be accessible, without the need to enter your residence. If you would like to be contacted prior to the sampling event, please indicate accordingly on the Well Sample Access Request form.

For your information, I have included an EPA publication regarding household wells and a factsheet about PCE. If you have questions, or require additional information, please feel free to contact me at 404-562-XXXX, or by e-mail at lastname.firstname@epa.gov. You may also contact our Community Information Coordinator, EPA Staff Name, at 404-562-XXX, by e-mail at lastname.firstname@epa.gov.

Sincerely,

EPA staff name
EPA staff title
Section or Branch
EPA Region 4

Enclosures

Access Authorization Form to Sample Residential Wells

Site Name

Location (locality, county, state)

1. I, _____, am the current owner or tenant of the Property and as such I have the authority to sign this authorization.
2. I grant authorization of the United States Environmental Protection Agency (EPA), its officers, employees, contractors and other authorized representatives to enter the property located at:

(The "Property"). This authorization allows EPA, its officers, employees, contractors and other authorized representatives to have access to the Property to collect ground water samples from the well(s) on the Property.

3. The consent for access and use granted herein will commence October 20, 2008 and will continue until November 14, 2008.
4. I realize that these actions by EPA are undertaken pursuant to its responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA" or "Superfund") of 1980, 42 U.S.C. & 9601 et seq., as amended.

Date: _____

Printed Name of Owner: _____

Signature of Owner: _____

Mailing Address: _____

Phone number: _____

Or:

Date: _____

Printed Name of Tenant: _____

Signature of Tenant: _____

Mailing Address: _____

Phone Number: _____

Well Information Request Form

Please answer the following questions to the best of your knowledge.

Your name: _____

Property address: _____

Is the residence currently occupied? _____

Number of residents and their ages: _____

Is this house on a water-supply well or a spring? _____

Does the residence share the well or spring with another residence(s)? _____

If yes, provide the physical address of all residences: _____

Would you like to be notified prior to sampling? _____

Do you want to be present during sampling? _____

Please indicate how we can contact you. Please provide your contact information here:

If on a water-supply well, please provide the following information (if known):

Total depth of well: _____ Date drilled: _____

Name of drilling company: _____ Casing depth: _____

Casing material: _____ Gallons per minute: _____

Static water level: _____ Spigot at the wellhead? _____

Please explain and/or provide a rough sketch below of where the well or spring is located on your property relative to the house or other structures:

Soil Sampling Access Agreement Cover Letter and Access Request Form



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4

SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

URGENT LEGAL MATTER

PROMPT REPLY NECESSARY

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

RE: Access Authorization to Sample Your Property at 123 North Main Street

Dear Ms. Public:

The United States Environmental Protection Agency (EPA) is investigating the release or threat of release of hazardous substances, pollutants, or contaminants at the ABC Plant site (the Site) in Any Town, Any County, Any State. Pursuant to EPA's mandate to protect human health and the environment, EPA is requesting that homeowners in the nearby area grant access to their property in order to conduct soil sampling. Access to your property is necessary to collect samples for pesticides, which may be present as a result of migration from the site property onto your property.

EPA requests that access be granted to your property beginning on June 28, 2010. The grant of access will be effective for the duration of the investigation and sampling activities. EPA anticipates that activities will commence on June 28 and expects to complete the investigation on or before July 16, 2010. Sampling will require less than one day's time to complete. However, actual start and completion dates cannot be predicted with certainty because they are subject to schedule conflicts and unforeseen circumstances. If EPA needs to change the time period during which sampling is conducted, we will consult with you and arrange a new agreement for the preferred dates.

Please indicate consent to grant access to EPA to conduct the above described activities by signing and dating the enclosed access authorization and mailing it back to EPA, using the pre-paid UPS overnight air shipping label, no later than June 17, 2010. EPA recommends that you keep a copy of the agreement for your records.

Pursuant to Section 104(e) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (ACERCLA), 42 U.S.C. ' 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (ASARA) (Public Law 99-499), EPA has the express authority to acquire access to property affected by hazardous substances and to conduct the planned investigation and sampling activities. If a request for access is denied, an administrative order directing compliance with the request may be issued, civil action to compel compliance may be initiated or access may be sought by any other lawful means. (Under certain circumstances, a court may impose a civil

penalty in an amount not to exceed \$37,500 per day for failure to grant access or comply with an administrative order directing that access be granted.)

If you should have any questions, please contact me at 404-562-XXXX, or Public Affairs Specialist Staff Name at 404-562-XXXX or 800-564-XXXX. Legal questions should be directed to Staff Name at 404-562-XXXX. Your assistance and cooperation are greatly appreciated.

Sincerely,

EPA staff name
EPA staff title
Section or Branch
EPA Region 4

Enclosures

Access Authorization Form to Conduct Sampling Activities

Site Name

Location (locality, county, state)

1. I, _____, am the current owner (or tenant) of the property located at _____ (the "Property"), and, as such, I am authorized to sign this document.
2. I grant authorization to the United States Environmental Protection Agency (EPA), its officers, employees, contractors and other authorized representatives to enter upon and have continued access to the Property. This authorization allows EPA, its officers, employees, contractors and other authorized representatives to have access to the Property to conduct certain sampling activities. EPA's activities at the Property may include, but are not limited to, the following:
 - a. Collecting soil samples as may be determined to be necessary.
 - b. Surveying the Property to establish sampling locations.
3. The consent for access and use granted herein will commence on June 28, 2010, and will continue through July 16, 2010. EPA estimates the sampling will take less than one day.
4. I recognize that EPA's request and use of the Property is undertaken pursuant to Section 104(a) of the Comprehensive Environmental, Response, Compensation and Liability Act ("CERCLA" or "Superfund"), 42 U.S.C. § 9604(a) *et. seq.*, as amended.
5. I have been notified that parties found responsible pursuant to section 107(a) of CERCLA, 42 U.S.C. § 9607(a), may be liable for all costs EPA incurs in connection with the response that are not inconsistent with the National Contingency Plan ("NCP"), at 40 C.F.R. Part 300.
6. By granting this authorization, I do not admit any liability under CERCLA in relation to the Property and do not waive any rights to which I may be entitled.

Date: _____

Printed Name of Owner: _____

Signature of Owner: _____

Or:

Printed Name of Tenant: _____

Signature of Tenant: _____

Follow Up Property Access Agreement

Recently, the contaminant [contaminant name] was found in your [media]. The contamination is currently affecting your [well] or could affect your [well] in the future and thereby the health and welfare of [you and your family]. The United States Environmental Protection Agency (EPA) would like to provide you with [bottled water] and [connect your location type to the public water system]. Please read the following:

As the owner of the [location type] located at _____, I grant access to [EPA and its contractors] for the purpose of [delivering drinking water and constructing a water line from the public water system] [Utility Name, if applicable] to my [location type].

EPA will provide [bottled water for a period of 14 days], an interim measure to protect [myself and my family] from exposure to [contaminant name], a contaminant found in my [media], until [a connection to the public water system] [Utility Name, if applicable] is installed.

I understand that if I refuse to [connect to the public water system], EPA [may discontinue supplying bottled water in 14 days].

I understand EPA will [install a water line from the public water system] to my [location type] free of charge.

I understand that I will be responsible for [payment for the use of the water] at rates determined by [Utility Name] once [the "water hook-up" is installed].

I understand that EPA will [disconnect my current water supply (well)] from [location type] and [permanently close-out the well to prevent the possibility of future cross-contamination].

I understand that any costs associated with [any repairs of the water line in the future] will not be the responsibility of the EPA.

I understand that if I refuse this offer, there is no guarantee that it will be offered again in the future.

YES, _____ I accept EPA's offer. Date: _____
(signature)

NO, _____ I refuse EPA's offer. Date: _____
(signature)

If you have any questions, I can be reached at [(XXX) XXX-XXXX] or [lastname.firstname@epa.gov].

Sincerely,

EPA staff name
EPA staff title
Section or Branch
EPA Region 4

Appendix D

Region 4 Records Management Policies Memorandum



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 10 2010

MEMORANDUM

SUBJECT: Responsibilities for Complying with EPA's Records Management Policies
When Communicating with the Public on Site-Related Activities

FROM: Franklin E. Hill, Director
Superfund Division

TO: Superfund Division Employees

This memorandum is to remind employees of their responsibility for complying with EPA's Records Management Policies when communicating with the public on site-related activities.

The EPA Records Management Manual indicates that a federal record is an information resource, in any format, that is:

- Created in the course of business,
- Received for action, or
- Needed to document Agency activities.

Records are "all books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the United States Government under Federal law or in connection with the transaction of public business and preserved or appropriate for preservation by that agency or its legitimate successor as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the Government or because of the informational value of data in them." (44 U.S.C. § 3301)

Verbal communications in relation to Superfund site activities are also considered to be a federal record and must be treated as such. Verbal communications can be in the form of a telephone conversation, a voice mail message or series of voice mails, a formal meeting, or even an informal conversation. The Agency's Records Management Manual and the Superfund Community Involvement Toolkit provide written guidance on your records management responsibilities. Below are important points to remember about verbal communications.

- **What is the best way to capture conversations as records? Write a memo to the file.**
Be sure to include:
 - date and time of the communication
 - type of communication (e.g., voice mail, telephone)

- participants
 - subject
 - details on any decisions or commitments
- **What kind of verbal communications might be a record?** An oral communication where an Agency decision or commitment is made and could be made, and that is not otherwise documented, needs to be captured and placed in your record keeping system.
 - A meeting or conference call where a decision is made, if formal meeting notes are not taken.
 - A telephone call giving guidance to a member of the regulated community.
 - A voice mail message committing to take action.
 - A telephone call responding to a member of the public about EPA policy.
 - **What types of communications are included?**
 - Face-to-face meetings
 - Conference calls (including audio or video)
 - Telephone calls (including cell phones, walkie-talkies, CB radios)
 - Voice mail messages (including telephone or computer)
 - **Does this mean that I have to write a transcript of every conversation?** No, not all verbal communications are records. Only write a memo to the file for verbal communications if they are:
 - Needed to document your activities as a federal employee, contractor, or other EPA agent
 - Not otherwise captured in your recordkeeping system

For further information, please refer to the Records Management Manual by visiting <http://www.epa.gov/records/policy/manual> and the Superfund Community Involvement Toolkit at <http://www.epa.gov/superfund/community/toolkit.htm>

Appendix E

Region 4 Private Well Monitoring and Analysis Fact Sheet

Private Well Monitoring and Analysis Fact Sheet

September 30, 2010

The following information is offered to clarify the private well monitoring efforts that EPA conducts in relation to Superfund investigations and how these efforts differ from the monitoring of public water systems under the Safe Drinking Water Act. The primary purpose of the Superfund program is to investigate and clean up abandoned or uncontrolled hazardous waste sites under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). While testing of private wells is not required or regulated by the federal government under the Safe Drinking Water Act, private drinking water wells are often incorporated into a Superfund site study.

The objective in monitoring these wells is to determine attribution and possible migration of constituents from a Superfund site into private drinking water wells and to avoid duplicating the work that the Safe Drinking Water Act would require of a public water system. Since analytical methods and target analytes used by Superfund are focused primarily on potential site-related chemicals, testing of private wells in connection with a Superfund investigation is not a substitute for routine well monitoring by well owners as recommended by EPA. These recommendations are available online at:

www.epa.gov/safewater/privatewells/whatyoucando.html. A more detailed discussion of household wells and drinking water safety is available at:

www.epa.gov/safewater/privatewells/pdfs/household_wells.pdf. EPA encourages private well owners to follow these guidelines, whether or not there is a Superfund-related investigation in their area.

Target Constituents

There are several differences between Superfund testing and public water system monitoring. Superfund routinely includes scans for organic chemicals (volatile organic chemicals (VOCs), semi-volatile organic chemicals (SVOCs), pesticides, and aroclors) and inorganic chemicals (metals, mercury and cyanide). Project managers select only those categories relevant to their site. The primary categories for public water system monitoring include microorganisms, disinfectants, disinfection byproducts, inorganic chemicals, organic chemicals and radionuclides. Superfund does not test for microorganisms, disinfectants and disinfection byproducts, as they are not relevant to Superfund decision-making. Radionuclides are rarely tested for under Superfund.

For inorganic chemicals and organic chemicals, there is some overlap with Superfund. Under inorganic chemicals, public water systems monitor 10 metals, mercury and cyanide as primary contaminants. Additional metals may be monitored as secondary contaminants. Superfund monitors 22 metals, mercury and cyanide. Public water systems also monitor for asbestos, fluoride, nitrates and nitrites. Superfund does not routinely monitor for these constituents. Under organic chemicals, public water systems monitor for 55 organic chemicals. Superfund monitors for up to 148 organic chemicals, if all four organic categories are tested for. While the organic and inorganic constituents monitored have some overlap between Superfund and the Safe Drinking Water Act, many analytes are different, reflecting the different purposes of the two programs.

Methods

Superfund does not issue analytical methods. Our primary resources for analytical services are the Regional laboratory and the national Contract Laboratory Program (CLP). While each regulatory program issues analytical methods, these methods are often similar and employ the same instrumentation. The Regional laboratory will select the most updated and feasible method when

analyzing Superfund samples. For the CLP, the "methods" are contractual Statements of Work which cover environmental samples and provide detailed instructions to the laboratories. They are based on the same basic procedures that underlie the regulatory methods. Advantages to using the CLP for Superfund work include timeliness in accessing service, a strong national quality program and electronic data review tools.

Reporting Levels

Reporting levels can be customized to specific site needs to some extent for both the Regional laboratory and the CLP. In the absence of special requests, the routine approach for the Regional laboratory is to lower reporting levels to Maximum Contaminant Levels (MCLs) for only those contaminants which have an MCL. In the absence of special requests, the routine approach for the CLP, *when the lowest reporting levels available from the contract are requested*, provides the following results: VOCs meet MCLs, SVOCs meet MCLs, except for hexachlorobenzene and atrazine, pesticides meet MCLs except for toxaphene, polychlorinated biphenyls analyzed as aroclor mixtures do not meet MCLs, metals meet MCLs, mercury meets the MCL, and cyanide meets the MCL. The levels are as low as feasible for constituents that do not have MCLs, but do not achieve risk-based screening levels for all of those constituents. Many monitored constituents happen to be in the same analytical scan list as site-related compounds and are not actually suspected to be present, so specialized studies and procedures to achieve additional risk-based levels for constituents are only undertaken for site-related contaminants. Site-related contaminants are established by testing source area(s) for the suspected contamination.

Region 4 Definitions Relating to Reporting Levels

Method Detection Limit (MDL): The MDL is calculated by a study described in 40 CFR Part 136; Appendix B. The value calculated in the MDL study performed on the instrument used for the sample should be entered, without any project-specific or sample-specific adjustment. This is a laboratory/method/instrument capability value and will vary slightly by laboratory and instrument. This value is not associated with a specific project, so it is usually not reported in the data.

Quantitation Limit (QL): The QL should correspond to the lowest calibration standard performed as passing for the method, without sample-specific adjustment, and should be chosen in advance for a specific project. EPA should establish this value prior to sample analysis in the Quality Assurance Project Plan. This value should ideally be 3-to-10 times lower than the screening limit (i.e., the benchmark) rather than right at the screening limit, when technically feasible. The laboratory QL that is achievable (on a standard) must be at or below the Project QL that we adopt as our QL. This is a project planning value. Laboratory QLs for the Region 4 Laboratory are available online at: www.epa.gov/region4/sesd/asbsop/asb-logam.pdf in Chapter 7 and are called "Minimum Reporting Limits" in that reference. Laboratory QLs for the Contract Laboratory Program are available online at www.epa.gov/superfund/programs/clp/target.htm and are called "Contract Required Quantitation Limits" in that reference.

Reporting Limit: Region 4 typically uses this term for the Sample-Specific Quantitation Limit, which has been adjusted for dilutions, moisture content or other sample-specific factors. This value is the quantitation limit actually achieved in the analysis, and may be the same as the Quantitation Limit set as the goal for project planning. However, this value will often be higher than the Quantitation Limit, since the goal of this minimum reporting limit can only be achieved for relatively clean samples. This is the value that normally appears on the data sheet for data reporting. This is a data-reporting value and will vary according to sample matrix of the specific sample.

Reporting of Non-detects and Estimated Values: The Sample-Specific Quantitation Limit (Reporting Limit) is the value at which non-detects will be reported and below which the J-flag will be applied for detects for that analyte/sample. For samples where nothing is detected or the apparent detection is below the MDL, the analytes will be reported as non-detect by attaching a U-flag to the Reporting Limit. For samples where the detection is between the MDL and the Reporting Limit, the value will be reported as detected with a J-flag for "estimated."

Appendix F

Sample Letter (No Exceedances)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Ms. Public:

During the week of August 30, 2010, the United States Environmental Protection Agency (EPA) conducted soil sampling on your property at 123 North Main Street. The purpose of the sampling was to determine whether contamination was present in the soil that may be related to the XYZ Corporation National Priorities List (NPL) site and to evaluate if any further response actions are necessary to protect public health and the environment. As you are probably aware, the XYZ Corporation property is located a quarter mile north of your property.

Two investigative samples were collected on the property in August 2010: one soil sample was collected in the front yard and one soil sample was collected in the back yard. The investigative samples consisted of five subsamples taken within a five-foot diameter area, at a 0-3 inch depth, and combined into one sample. The soil samples collected were analyzed for metals and organic compounds.

There were no contaminants detected that exceeded any applicable health-based benchmarks for your property. Laboratory data sheets, which list all of the potential contaminants analyzed for during the sampling, are available upon request. Region 4's website also provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

For more information about the XYZ Corporation NPL site, please see www.epa.gov/region4/waste/npl/nplga/xyz.htm. For general information about the Superfund program, which cleans up NPL sites, please see www.epa.gov/superfund.

At this time, EPA has not scheduled a public meeting to discuss the August 2010 sampling results. If residents would like EPA to host a meeting, please contact John Smith, our Community Involvement Coordinator, at 800-562-XXXX (toll-free) or directly at 404-562-XXXX, or by e-mail at smith.john@epa.gov. Alternatively, please do not hesitate to contact either John or myself (contact information below) if you have any questions about the sampling results.

Sincerely,

EPA staff name

EPA staff title

Section or Branch

Telephone: 404-562-XXXX

E-mail: lastname.firstname@epa.gov

Appendix G

Sample Letter (Primary Exceedances)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Mr. John Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Mr. Public:

During the week of August 30, 2010, the United States Environmental Protection Agency (EPA) conducted soil sampling on your property at 123 North Main Street. The purpose of the sampling was to determine whether contamination was present in the soil that may be related to the XYZ Corporation National Priorities List (NPL) site and to evaluate if any further response actions are necessary to protect public health and the environment. As you are probably aware, the XYZ Corporation property is located a quarter mile north of your property. The analytical results from the samples that EPA collected from your property are enclosed.

Two investigative samples were collected on the property in August 2010: one soil sample was collected in the front yard and one soil sample was collected in the back yard. The investigative samples consisted of five subsamples taken within a five-foot diameter area, at a 0-3 inch depth, and combined into one sample. The soil samples collected were analyzed for metals and organic compounds.

The results are provided in the enclosed summary table which compares the constituents detected in each sample to applicable health-based benchmarks. Please note that only constituents detected above Regional Screening Levels (RSLs) or Maximum Contaminant Levels (MCLs) are included in the summary table. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

EPA has evaluated the sampling results and determined that lead, manganese and zinc are present in the soil on your property in concentrations that exceed EPA Removal Action Levels (RALs). EPA has determined that soil excavation in your backyard is warranted. EPA will be in contact with you to discuss this issue and make further arrangements. In the meantime, EPA recommends as a prudent precaution that you limit exposure to the soil in your yard. Most importantly, take care to prevent incidental ingestion of contaminated soil by washing your hands after working in your yard or garden. Also, take particular care to clean the hands and toys of young children if they have been playing in the yard.

Summary Table: 123 North Main Street

Constituent	Health Screening Level	Comparison	8/31/2010	8/31/2010
			XYZ-123-FY front yard	XYZ-123-BY back yard
Lead	400	RSL	ND	570
Manganese	1,800	RSL	ND	4,500
Zinc	23,000	RSL	220 J	28,500
Notes:				
All values are in milligrams per kilogram (mg/kg)				
J = The identification of the constituent is acceptable; the reported value is an estimate				
ND = Not detected above the laboratory detection limit				
RSL = www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm				
Bolded and highlighted = value exceeds the associated health-based screening criteria				

Please find enclosed a pamphlet that provides general information about metals contamination in soil. If you are concerned about future or past exposures, you or your doctor can contact the State or County Name Health Department and/or the Agency for Toxic Substances and Disease Registry (ATSDR; www.atsdr.cdc.gov). Names and contact information can be provided upon your request. For more information about the XYZ Corporation NPL site, please see www.epa.gov/region4/waste/npl/nplga/xyz.htm. For general information about the Superfund program, which cleans up NPL sites, please see www.epa.gov/superfund.

At this time, EPA has not scheduled a public meeting to discuss the August 2010 sampling results. If residents would like EPA to host a meeting, please contact John Smith, our Community Involvement Coordinator, at 800-562-XXXX (toll-free) or directly at 404-562-XXXX, or by e-mail at smith.john@epa.gov. Alternatively, please do not hesitate to contact either John or myself (contact information below) if you have any questions about the sampling results.

Sincerely,

EPA staff name
EPA staff title
Section or Branch
Telephone: 404-562-XXXX
E-mail: lastname.firstname@epa.gov

Enclosures

cc: Mr. Bob Williams
Project manager, AnyState Department of Natural Resources

Ms. Pat Moore
Director, Everyplace County Health Department



Appendix H

Sample Letter (Secondary Exceedances)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Ms. Public:

During the week of August 30, 2010, the United States Environmental Protection Agency (EPA) conducted well water sampling on your property at 123 North Main Street. The purpose of the sampling was to determine whether contamination was present in your drinking water that may be related to the XYZ Corporation National Priorities List (NPL) site and to evaluate if any further response actions are necessary to protect public health and the environment. As you are probably aware, the XYZ Corporation property is located a quarter mile north of your property. The analytical results from the samples that EPA collected from your property are enclosed.

Because you have a whole house filter system, EPA collected two samples from your property: one sample was collected before filtration in order to evaluate the quality of the untreated ground water and a second sample was collected after filtration to evaluate the quality of the treated tap water in your home. Both of the samples collected from your property were analyzed for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organochlorine pesticides, polychlorinated biphenyls (PCBs) and cyanide. The unfiltered sample was analyzed for the additional parameters of acidity, alkalinity and sulfate to further evaluate potential influence from the XYZ Corporation NPL site.

The results are provided in enclosed summary table, which compares the constituents detected in each sample to applicable health-based benchmarks. Please note that only constituents detected above applicable health-based benchmarks are included in the summary table. Laboratory data sheets, which list all of the potential contaminants analyzed for during the sampling, are available upon request. Region 4's website also provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

Summary Table: 123 North Main Street

Constituent	Health Screening Level	Comparison	8/31/2010	8/31/2010
			XYZ-123-UF unfiltered	XYZ-123-F filtered
Cobalt	11	RSL	14	ND
Manganese	880	RSL	1,100	12
Sodium	20,000	DWA	5,700	78,000 J
Notes:				
All values are in micrograms per liter (µg/L)				
DWA = drinking water advisory				
J = The identification of the constituent is acceptable; the reported value is an estimate				
ND = Not detected above the laboratory detection limit				
RSL = www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm				
Bolded and highlighted = value exceeds the associated health-based screening criteria				

The sampling results have been reviewed by EPA. In the unfiltered sample, manganese and cobalt were detected above their respective health-based benchmarks. The results from the filtered sample indicate that the whole house filter system is successfully removing manganese and cobalt to levels below health-based benchmarks. Sodium levels in your filtered water are increased by the treatment system from 5,700 micrograms per liter (µg/L) to 78,000 µg/L. This result exceeds the non-regulatory EPA Office of Water, Drinking Water Advisory level of 20,000 µg/L for sodium for individuals on a restricted sodium diet. If anyone in the household is on a restricted sodium diet, consider consulting a physician to discuss options for managing sodium intake. There are no other constituents detected in the filtered sample that exceed EPA's National Primary Drinking Water Regulations or other health-based benchmarks. EPA recommends maintaining the whole house filter system in accordance with manufacturer recommendations.

Please find enclosed a pamphlet that provides general information about drinking water from home wells. For more information regarding private wells in general, EPA's website (water.epa.gov/drink/info/well/index.cfm) provides information for private well users who rely on their wells for drinking water and household use. It is important to remember that well owners have primary responsibility for the safety of the water drawn from their well. EPA recommends testing your water every year for total coliform bacteria, nitrates, total dissolved solids and pH levels. If other contaminants are suspected, make sure to test for those constituents as well.

For more information on ground water quality in the area, well owners should contact the State or Country Name Health Department at 123-456-XXXX and/or the Agency for Toxic Substances and Disease Registry (ATSDR; www.atsdr.cdc.gov) for information, available services and guidance. Names and contact information can be provided upon your request. The AnyState Division of Public Health provides information on well sampling. They can be contacted at 123-456-XXXX. For more information about the XYZ Corporation NPL site, please see www.epa.gov/region4/waste/npl/nplga/xyz.htm. For general information about the Superfund program, which cleans up NPL sites, please see www.epa.gov/superfund.



At this time, EPA has not scheduled a public meeting to discuss the August 2010 sampling results. If residents would like EPA to host a meeting, please contact John Smith, our Community Involvement Coordinator, at 800-562-XXXX (toll-free) or directly at 404-562-XXXX, or by e-mail at smith.john@epa.gov. Alternatively, please do not hesitate to contact either John or myself (contact information below) if you have any questions about the sampling results.

Sincerely,

EPA staff name

EPA staff title

Section or Branch

Telephone: 404-562-XXXX

E-mail: lastname.firstname@epa.gov

Enclosure

Appendix I

Sample Letter (Lead in Ground Water)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Mr. John Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Mr. Public:

During the week of August 30, 2010, the United States Environmental Protection Agency (EPA) conducted well water sampling on your property at 123 North Main Street. The purpose of the sampling was to determine whether contamination was present in your drinking water that may be related to the former ABC Plant and to evaluate if any further response actions are necessary to protect public health and the environment. As you are probably aware, the ABC Plant is located a quarter mile north of your property. The analytical results from the samples that EPA collected from your property are enclosed.

Elevated heavy metals in private drinking water can be a result of the leaching of metals in plumbing pipes, fittings and pumps into water resources. As a result, your well was resampled using a technique called a "first draw," followed by a purge, or emptying, of the standing water in the pipes and then a second, post-purge sample. Both of the samples were analyzed for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organochlorine pesticides, polychlorinated biphenyls (PCBs) and cyanide.

The results are provided in the enclosed summary table which compares the constituents detected in each sample to applicable health-based benchmarks. Please note that only constituents or contaminants detected above Regional Screening Levels (RSLs) or Maximum Contaminant Levels (MCLs) are included in the summary table. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website provides additional information regarding sampling benchmarks and detection levels:
www.epa.gov/region4/waste/ots/index.html.

Summary Table: 123 North Main Street

Constituent	Health Screening Level	Comparison	8/31/2010	8/31/2010
			XYZ-123-FD first draw	XYZ-123-P post-purge
Lead	15	MCL	19	18
Notes:				
All values are in micrograms per liter (µg/L)				
J = The identification of the constituent is acceptable; the reported value is an estimate				
MCL = federal drinking water Maximum Contaminant Level				
ND = Not detected above the laboratory detection limit				
Bolded and highlighted = value exceeds the associated health-based screening criteria				

EPA has evaluated the enclosed sampling results and has determined that lead is present in your drinking water at a concentration greater than the acceptable health-based benchmark. Therefore, EPA has begun delivering bottled water to your house. You should use bottled water for drinking and cooking. You should use your tap water for bathing and watering plants. Please call me at 404-562-XXXX if you need more bottled water delivered.

Please find enclosed a pamphlet that provides general information about drinking water from home wells. For more information regarding private wells in general, EPA's website (water.epa.gov/drink/info/well/index.cfm) provides information for private well users who rely on their wells for drinking water and household use. It is important to remember that well owners have primary responsibility for the safety of the water drawn from their well. EPA recommends testing your water every year for total coliform bacteria, nitrates, total dissolved solids and pH levels. If other contaminants are suspected, make sure to test for those constituents as well.

For more information on ground water quality in the area, well owners should contact the State or Country Name Health Department at 123-456-XXXX and/or the Agency for Toxic Substances and Disease Registry (ATSDR; www.atsdr.cdc.gov) for information, available services and guidance. Names and contact information can be provided upon your request. The AnyState Division of Public Health provides information on well sampling. They can be contacted at 123-456-XXXX. For more information about the ABC Plant site, please see www.epaosc.org/site/site_profile.aspx?site_id=5527. For general information about the Superfund program, which cleans up contaminated sites, please see www.epa.gov/superfund.

At this time, EPA has not scheduled a public meeting to discuss the August 2010 sampling results. If residents would like EPA to host a meeting, please contact John Smith, our Community Involvement Coordinator, at 800-562-XXXX (toll-free) or directly at 404-562-XXXX, or by e-mail at smith.john@epa.gov. Alternatively, please do not hesitate to contact either John or myself (contact information below) if you have any questions about the sampling results.



Sincerely,

EPA staff name

EPA staff title

Section or Branch

Telephone: 404-562-XXXX

E-mail: lastname.firstname@epa.gov

Enclosures

cc: Mr. Bob Williams
Project manager, Georgia Department of Natural Resources

Ms. Pat Moore
Director, Everyplace County Health Department

Appendix J

Sample Letter (Lead in Soil)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Ms. Public:

During the week of August 30, 2010, the United States Environmental Protection Agency (EPA) conducted soil sampling on your property at 123 North Main Street. The purpose of the sampling was to determine whether contamination was present in the soil that may be related to the former ABC Plant and to evaluate if any further response actions are necessary to protect public health and the environment. As you are probably aware, the ABC property is located a quarter mile north of your property. The analytical results from the samples that EPA collected from your property are enclosed.

Two investigative samples were collected on the property in August 2010: one soil sample was collected in the front yard and one soil sample was collected in the back yard. The investigative samples consisted of five subsamples taken within a five-foot diameter area, at a 0-3 inch depth, and combined into one sample. The soil samples collected were analyzed for metals and organic compounds.

The results are provided in the enclosed summary table which compares the constituents detected in each sample to applicable health-based benchmarks. Please note that only constituents or contaminants detected above Regional Screening Levels (RSLs) or Maximum Contaminant Levels (MCLs) are included in the summary table. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website provides additional information regarding sampling benchmarks and detection levels:
www.epa.gov/region4/waste/ots/index.html.

EPA has evaluated the enclosed sampling results and determined that lead is present in the soil on your property at a concentration that exceeds the EPA Region 4 Removal Action Level (RAL). EPA has determined that soil excavation in the backyard is warranted. EPA will be in touch with you to discuss this issue and make further arrangements. In the meantime, EPA recommends as a prudent precaution that you limit exposure to the soil in your yard. Most importantly, take care to prevent incidental ingestion of contaminated soil by washing your hands after working in your yard or garden. Also, take particular care to clean the hands and toys of young children if they have been playing in the yard.

Summary Table: 123 North Main Street

Constituent	Health Screening Level	Comparison	8/31/2010	8/31/2010
			ABC-1220-FY front yard	ABC-1220-BY back yard
Lead	400	RSL	ND	570
Notes:				
All values are in milligrams per kilogram (mg/kg)				
ND = Not detected above the laboratory detection limit				
RSL = www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm				
Bolded and highlighted = value exceeds the associated health-based screening criteria				

Please find enclosed a pamphlet that provides general information about lead contamination in soil. If you are concerned about future or past exposures, you or your doctor can contact the State or County Name Health Department and/or the Agency for Toxic Substances and Disease Registry (ATSDR; www.atsdr.cdc.gov). Names and contact information can be provided upon your request. For more information about the ABC Plant site, please see www.epaosc.org/site/site_profile.aspx?site_id=5527 or visit the site's document repository at the Anytown Public Library, located at 44 Pine Street. For general information about the Superfund program, which cleans up contaminated sites, please see www.epa.gov/superfund.

At this time, EPA has not scheduled a public meeting to discuss the August 2010 sampling results. If residents would like EPA to host a meeting, please contact John Smith, our Community Involvement Coordinator, at 800-562-XXXX (toll-free) or directly at 404-562-XXXX, or by e-mail at smith.john@epa.gov. Alternatively, please do not hesitate to contact either John or myself (contact information below) if you have any questions about the sampling results.

Sincerely,

EPA staff name
EPA staff title
Section or Branch
Telephone: 404-562-XXXX
E-mail: lastname.firstname@epa.gov

Enclosures

cc: Mr. Bob Williams
Project manager, Georgia Department of Natural Resources

Ms. Pat Moore
Director, Everyplace County Health Department



Appendix K
Sample Letter (Air Sampling)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303

Ms. Jane Q. Public
123 North Main Street
Anytown, Georgia 30303

Month Day, Year

SUBJECT: Sampling Results for Property at 123 North Main Street

Dear Ms. Public:

As you are aware, United States Environmental Protection Agency (EPA) contractors installed a vapor mitigation system in the crawlspace of your house during the week of January 11, 2010. The purpose of the system is to catch vapors as they come out of the ground and ventilate them to the outside air. On January 27, 2010, EPA sampled the air in your crawlspace and outside your house to determine whether the system is working properly. The analytical results from the samples that EPA collected from your property are enclosed.

Two air samples were collected on the property in January 2010; one was collected in the crawlspace and one was collected in the side yard. The samples were analyzed for volatile organic compounds.

Based on the results of the January 2010 sampling, the vapor mitigation system is working properly. The outside air and crawlspace air concentrations were very similar. The levels of all constituents that were detected in the air at your house were below health-based screening levels. Laboratory data sheets, which list all of the potential constituents analyzed for during the sampling, are available upon request. Region 4's website also provides additional information regarding sampling benchmarks and detection levels: www.epa.gov/region4/waste/ots/index.html.

For more information about vapor intrusion into indoor air, please see www.epa.gov/osw/hazard/correctiveaction/eis/vapor.htm. For general information about the Superfund program, which cleans up contaminated sites, please see www.epa.gov/superfund.

EPA is committed to taking the appropriate response actions necessary to ensure that you and your family are not exposed to levels of chemicals in the air deemed to be unsafe over a lifetime of exposure. I will be visiting the area on March 5, 2010, and would like to take the opportunity to speak to you about the latest sampling results at that time. If you have any questions prior to that, please feel free to contact me at 404-562-XXXX.

Sincerely,

EPA staff name

EPA staff title

Section or Branch

Telephone: 404-562-XXXX

E-mail: lastname.firstname@epa.gov

Appendix L
Sample TSS Memoranda



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

August 23, 2010

4SD-SSB

MEMORANDUM

SUBJECT: Data Evaluation, Properties near the Placeholder Name of the Site, [REDACTED]

FROM: [REDACTED], Life Scientist
Technical Services Section
Superfund Division

TO: [REDACTED], Remedial Project Manager
Site Assessment Section
Superfund Division

THRU: [REDACTED], Chief
Technical Services Section
Superfund Division

Per your request, TSS has reviewed the data collected at residential properties near the [REDACTED]. Data includes the results of surface and subsurface soil samples collected from ditches and yards near the site. Potable water samples and subsurface soils were also collected.

Surface Soil Data

Surface soil samples (0-6" below land surface) were collected and submitted for semi-volatile organic compound (SVOC) and dioxin analysis. The SVOC data were screened against EPA's residential Regional Screening Levels (RSLs). RSLs are conservative risk-based screening values developed by EPA to help identify contaminants of potential concern. Table 1 shows the SVOC data screening results.

Table 1. [REDACTED] Site, [REDACTED] – Dioxin TEX Data Screening Table (ng/kg)

Location	SWP-RSS-01		SWP-RSS-02		SWP-RSS-03		SWP-RSS-04		SWP-RSS-05		SWP-RSS-06		Provisional Screening Value	OSWER Action Level
	Surface	Sub	Surface	Sub	Surface	Sub	Surface	Sub	Surface	Sub	Surface	Sub		
Dioxin	4	.66	16	6	45	5.7	270	10	53	14	30	1.2	72	1000

The initial screening step indicates that six SVOCs, all of which are polynuclear aromatic hydrocarbons (PAHs). They are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, exceeded their respective residential soil RSLs at one or more sample locations.

Sample locations where at least one contaminant exceeded its RSL include:

- SWP-RSS-02 – Residence at [REDACTED]
- SWP-RSS-03 (and its duplicate) – Residence at [REDACTED]
- SWP-RSS-04 – Residence at [REDACTED]
- SWP-RSS-05 – Residence at [REDACTED]

The highest concentrations of SVOCs were observed in sample SWP-RSS-04, [REDACTED].

Based on the results of the initial screening step, the SVOC data that exceeded RSLs were then compared to residential soil Removal Action Levels (RALs). RALs are in-house risk-based screening values developed by EPA to determine whether sample concentrations are sufficiently elevated that they may warrant a removal action. Exceedance of an RAL by itself does not require a removal action, nor does it imply that adverse health effects will occur. None of the detected contaminants exceeded its respective RAL.

The dioxin data were converted to toxicity equivalents (TEQ) concentrations screened against a provisional screening value of 72 ng/kg (nanograms per kilogram) in Table 2. The initial screening step indicates that dioxin exceeded the provisional screening value at a single location, SWP-RSS-04. The dioxin TEQ concentration at this sample location, 270 ng/kg, did not exceed the current OSWER action level of 1000 ng/kg.

Subsurface Soil Data

The SVOC data were screened against their respective RSLs. The initial screening step indicates that two SVOCs, benzo(a)anthracene and benzo(a)pyrene, exceeded their respective residential soil RSLs at one or more sample locations.

Sample locations where at least one contaminant exceeded its RSL include:

- SWP-RSS-04 – Residence at [REDACTED]
- SWP-RSS-05 – Residence at [REDACTED]

Based on the results of the initial screening step, the data were then compared to RALs. None of the detected contaminants exceeded its RAL. Subsurface soil samples were not submitted for dioxin analysis.

Conclusions

Based upon the review of the residential surface/subsurface soil data, it does not appear that any removal action is warranted at this time. Four of the soil sample locations collected in residential yard have concentrations of one or more contaminant above the conservative residential soil Regional Screening Levels. However, none of the detected contaminant concentrations exceed a Removal Action Limit. Therefore, all soil data are within EPA's acceptable risk range.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

November 18, 2009

MEMORANDUM

SUBJECT: Review of September 2009 Residential Well Sampling Data
[REDACTED] Site
[REDACTED]

FROM: [REDACTED]
Technical Services Section
Superfund Support Branch

TO: [REDACTED]
Emergency Response & Removal Branch

THROUGH: [REDACTED], Chief
Technical Services Section
Superfund Support Branch

Per your request, I have reviewed the September 2009 Residential Well Sampling Data,
[REDACTED] Site [REDACTED].

On the TSS Request Form, you specifically instructed TSS to "write up a memo documenting data that reflects PCE (or any other contaminant present) above MCLs and RALs. As a human health risk assessor, I have reviewed the private well data in comparison to MCLs (regulatory levels), health-based Removal Action Levels (RALs) and Lifetime Health Advisory (LHAs) (i.e., direct contact) for the ground water pathway. The discussion and comments below are for each residential well.

Sample CCR01PW [REDACTED]

The detections of chloroform and tetrachloroethylene are all below their respective RALs, MCLs and LHAs. No other reported detections for this dataset exceed RALs, MCLs or LHAs.

Sample CCR02PW2 [REDACTED]

The tetrachloroethylene detection of 8.2 ug/L exceeds its respective MCL (5 ug/L). However, it is below its respective RAL (10.8 ug/L). The detection of chloroform is below its respective RAL, MCL and LHA. Since the private well data exceed the MCL and the RAL was exceeded in other wells for PCE, ground water at this residence should not be used for drinking water (or any human use) without reduction of this concentration. No other reported detections for this dataset exceed RALs, MCLs or LHAs.

Sample CCR03PW2 [REDACTED]

The tetrachloroethylene detection of 13 ug/L exceeds its respective MCL (5 ug/L) and RAL (10.8 ug/L). The detection of chloroform is below its respective RAL, MCL and LHA. Since the private well data exceed the RAL and MCL for tetrachloroethylene, ground water at this residence should not be used for drinking water (or any human use) without reduction of this concentration. No other reported detections for this dataset exceed RALs, MCLs or LHAs.

Recommendations

It is recommended that an alternative water supply be used or a filtration system be added to the private wells at the following homes to remove or reduce the concentration of tetrachloroethylene exposure to the residents:

[REDACTED]

Future analysis should be considered the other private wells to ensure that tetrachloroethylene levels stay below MCLs and RALs.

If I can be of any further assistance or if you have any questions, please call me at [REDACTED].

References:

EPA 2009. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*, Interagency Agreement between EPA Office of Superfund and Oak Ridge National Laboratory, <http://epa-prgs.ornl.gov/chemicals/index.shtml>.

EPA 2004a. *Drinking Water Standards and Health Advisories*, Office of Water, update Winter 2004, EPA/822-R-04-005, <http://www.epa.gov/ost/drinking/standards>].